THE IRON AGE

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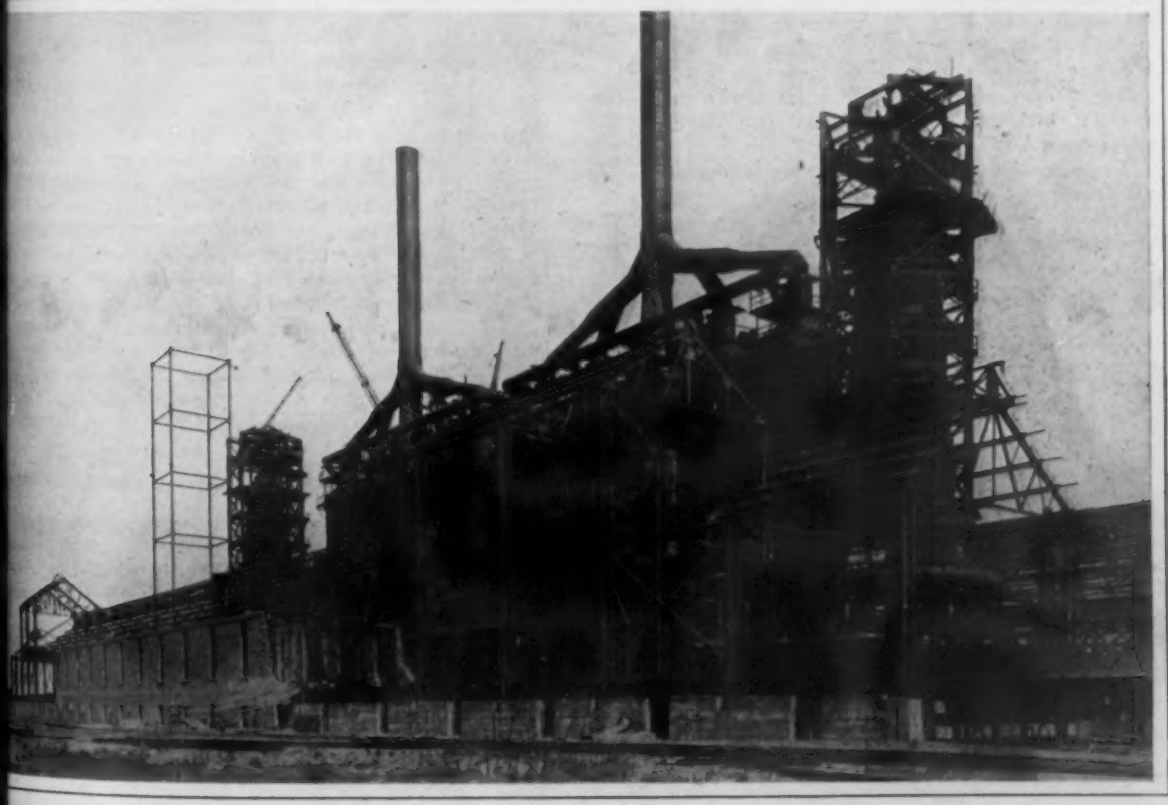
The Minnesota Steel Company's Plant

Its Special Engineering and Economic Problems—Labor Supply and Efficiency —A Year's Construction Work Ahead

The present status of the Minnesota Steel Company's rks near Duluth and the plans for its completion indi- e that the rolling of steel will not begin before the ng of 1915. During the coming winter weather con- ons will retard building progress and in the winter fol- ing an attempt to start up the plant would be attended h difficulties making it too hazardous. But the advent his new producing capacity is sufficiently near to make position as a new distributing center of interest. The cial operating conditions in such a high-latitude location if not rapid. The work thus far accomplished is indicated in a general way in the view of the blast furnaces, Fig. 1, and the mill buildings, Fig. 2. The steel work for the blast furnaces, dust catchers, stoves, stock houses and primary washers is in place and the brick linings will be completed before the advent of cold weather. The brick work for the coke ovens is being assembled under cover. Foundations for the cement plant have been laid, but it will not be completed until about the time the furnaces are ready to deliver slag. In the open-hearth building the re-



The Blast Furnaces in Process of Erection, Showing the Single Chimney for Each Group of Hot Stoves

ve also been indicated during the construction period in fairly definite way. The engineering features of the nt with which the special climatic conditions are to be t have now been fully worked out.

At the time of their inception the plans for the Duluth nt contemplated an expenditure of $6,000,000. This was 906. In 1907 and during the five years following some liminary work was done in establishing railroad con- ctions, making surveys and building foundations. Not il June, 1912, was the appropriation made for the actual nt building. Since that time progress has been steady, generative chambers are nearing completion and the building of the first two of the original battery of seven open-hearths has been started. In the mill buildings none of the equipment is permanently in place and a large part of it is not yet on the ground.

The original plans have been materially enlarged. Instead of $6,000,000 the expenditures now authorized total over $16,000,000 for the steel mills, for real estate, railroad connections, cement plant and 170 concrete houses. For the last named the contract has just been placed at Duluth. A proper balancing of the plant production has

Rail Finishing Mill Boiler Shop Machine Shop

General View of Minnesota Steel Company's Plant from Mill Side, Showing Blast Furnaces in Background. The Merchant

required the building of three additional open-hearth furnaces, making ten in all, and docks for receiving coal and limestone have yet to be equipped adjoining the Missabe ore docks.

Plant and Equipment

As provided for in the plans now authorized the Duluth works include the following:

Two 500-ton blast furnaces with five stoves each, and grid spray primary and Ernst secondary washers.

Ninety Koppers by-product coke ovens.

Ten 75-ton open-hearth furnaces, each equipped with 400-hp. waste heat boilers supplying steam to blooming mill drive.

Four 4-hole soaking pits with electrically operated covers.

One 40-in. blooming mill, steam driven, with hydraulic manipulator.

One 28-in. finishing mill, motor driven; blooming and finishing stands to take rolls for rolling rails, billets, beams up to 8 in., channels up to 10 in., angles up to 5 x 5 in.

One 16-in. continuous roughing train with three stands of 12-in., two stands of 10-in., and two stands of 8-in. finishing rolls, all motor driven.

Three continuous reheating furnaces, regenerative type, end discharge, for 16-ft. billets.

Power house containing four twin-tandem 3000-kw. Allis-Chalmers gas engine generators, also five 24,000-cu. ft. gas driven Bethlehem blowing engines.

Pumping station with capacity for 40,000,000 gal. daily.

Machine, forge and structural shops.

Completed on this basis, the plant is expected to produce 350,000 tons of finished products annually.

Special Construction Features

The length of time which has been available for planning for the building of the new works is apparent in the excellence of the general construction and in the studied elimination of undesirable features of design. With one exception, trestle approaches have been eliminated. Where necessary, excavations have been made to secure required differences in level. Special features have been worked out to meet the peculiar conditions of climate, labor and marketing.

The walls of the mill buildings are constructed with two-piece concrete blocks made by the Minnesota Steel Company and designed to provide continuous air passages in the walls. Liberal radiation has been provided for steam heating the buildings by the indirect system. Water pipes through which slow running water is piped are laid in the ground 7 ft. below surface. Hydraulic control has been entirely eliminated with the one exception of the blooming mill manipulator. The ore bins are entirely enclosed, with the bins proper below yard level. A steaming plant is installed for thawing the ore. Clean gas will be used in the blast furnaces, stoves to diminish the possibility of shutting down any stove. Each stove has an individual stack, but for each group of five stoves there is the unique provision of a single stack into which all the others lead. The arrangement is thus analogous to a boiler breeching, affording each stove when starting up the advantage of the hot central draft stack, a very important provision in a cold climate. The blast furnaces will be housed in corrugated steel during the winter months.

Labor Conditions

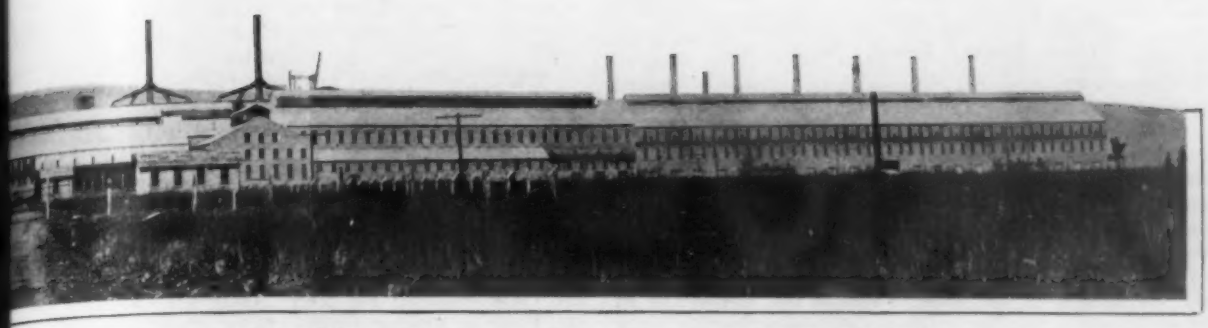
The labor situation presents some aspects unlike those obtaining at other steel plants. In the winter at the head of the lakes, open pit mining, railroad operation, lake shipping and many associated activities are curtailed to a minimum. The labor that does not seek the lumber camps has been accustomed to leave this part of the country. In the spring labor is required in every direction and the scarcity is increased as summer advances, by the demands of railroad construction and the harvest fields. There is in consequence a fluctuation in the labor market between minimum and maximum supply and at the time of greatest demand labor commands high rates. The steady all-the-year operation of the steel mill is quite out of tune with this labor situation, and the creation of a permanent working organization on the basis of a wage scale comparable with the rates at other steel plants is one of the problems. While the rate of pay will probably always be high at Duluth, the cool summer weather and ideal location of the plant will undoubtedly make the output of the labor well above the hot-weather efficiency at other plants.

With conditions naturally unfavorable to a uniform labor supply it may be expected that a great effort will be made to keep the mills at Duluth running continuously in order that the men may be held by the advantages of steady work. To this end the plant will undoubtedly be favored in tonnage wherever possible. It has also been designed with regard to rolls to give a maximum flexibility in rolling various products that its natural market will absorb in small quantities only. In other words roll changing has been reduced as much as possible.

Housing conditions for workmen are to be established with a higher standard of excellence than has been attempted elsewhere. A new design of concrete wall construction providing a double continuous air space within the walls has been adopted in the interest of warmth and dryness.

Duluth as a Steel Manufacturing and Distributing Point

Whatever may have been the reasons resulting in the decision to build a steel plant at Duluth, and the urgency of those reasons was advanced with emphasis, the greatly increased appropriations indicate not only the economic necessity of a balanced plant, but also a belief in the future of the market tributary to Duluth. Farming, the chief industry of the Northwest, does not require much steel in the direct-from-mill forms. Iron and steel manufacture is in its infancy west and north of Duluth, but a recent readjustment of freight rates favorable to Duluth has enlarged the market to the south and southeast very materially. But for the present at least the railroads will undoubtedly take the largest part of the tonnage produced. As a railroad center Duluth has made rapid strides in the past few years. The Soo Line, affiliated with the Canadian Pacific system, has built into Duluth with passenger, general freight and ore terminals. The Canadian Northern Railway has completed its own line through to Duluth from Winnipeg, this branch being known as the Duluth, Winnipeg & Pacific Railway, and is building up its tonnage with exceptional speed. These are in addition to the Northern Pacific, Great Northern and Chicago, St. Paul, Minneapolis & Omaha terminals, and the rapidly increasing operations of the two Steel Corporation ore roads. Duluth is also the location of two of the largest heavy hardware jobbing houses of the West and already the com-



ing Mill Building Soaking Pit Building Open-Hearth Building

mpleted and the Coke Ovens are Obscured in this View by the Open-Hearth Building and the Power House by the Blooming Mill

sumption of sheets and bars through jobbers is considerable. With steel available on a competitive basis and the general labor market improved, the advent of many forms of manufacture may be confidently expected.

The location of the plant as affecting the cost of assembling raw materials appears to give it a considerable net advantage. Limestone will be secured from Michigan, near Alpena, the development of which deposit will also supply the Chicago plants. Here Duluth will have a longer water haul against the haul to Chicago. Rail freights on coal from West Virginia to Chicago are more than the rail and lake rates to Duluth. On ore the Duluth plant will undoubtedly enjoy a special rail rate from the mine, an allowance being made for the elimination of the handling on the vessel loading docks. Ore also will be shipped continuously through the winter from the underground mines to the plant and it will not be necessary to carry any more ore at the furnaces than the stock bins will accommodate. On the other hand it will be necessary to secure the entire year's supply of coal and stone during navigation.

A Polishing Machine for Small Parts

A polishing machine designed for the rapid finishing of small parts has been brought out by Forbes & Myers, Union street, Worcester, Mass. As shown in the accompanying illustration, the machine is fitted at one end with a 6-in. grinding wheel and at the other with a scroll chuck, and a feature of the outfit is a combined switch and brake. The starting and stopping is done by the handle shown, and when the switch is opened, this automatically applies a brake, so that considerable time is saved in otherwise waiting for the machine to stop itself. The grinding wheel, of course, can be replaced by a buffing wheel, or spring or scroll chucks may be mounted at both ends. The ordinary speed of operation is 3600 r.p.m., but the machine may be furnished for working at a speed of 1800 r.p.m. The motor, which is of the squirrel cage induction type, is capable of supplying ½ h.p. intermittently and it is suitable for use on two or three-phase currents of 60 cycles.

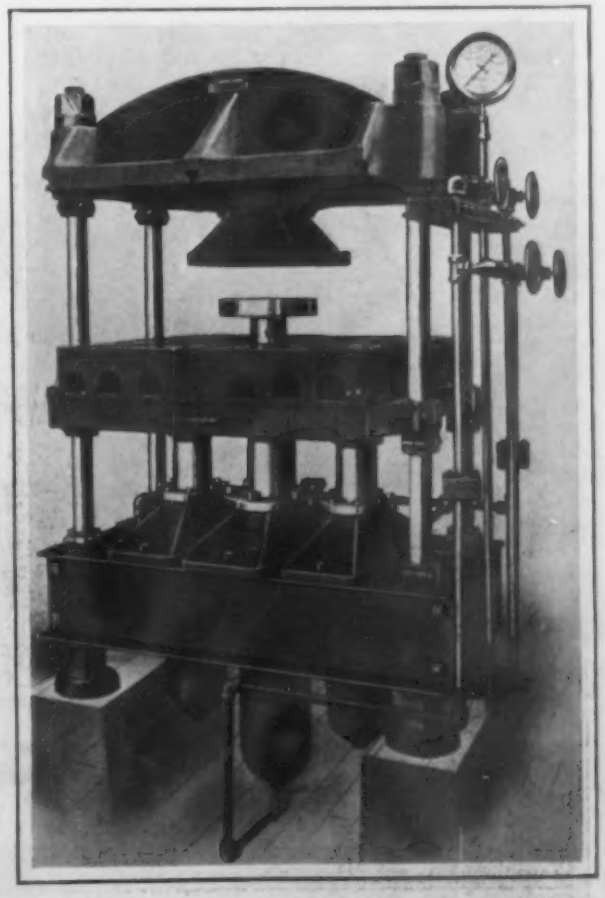
New Forbes & Myers Machine

A New Hydraulic Forming Press

Another special hydraulic forming press designed and built by the Hydraulic Press Mfg. Company, Mount Gilead, Ohio, is shown in the accompanying reproduction of a photograph. It is used for forming various shapes from sheet metal or other material requiring a medium pressure. Three cylinders and three rams are employed in operating the press. One 6-in. ram operates a blank holder and two 5-in. rams operate the pressure platen. The center, or 6-in. ram, is machined to a smaller diameter on the upper end than the bearing in its cylinder. The ram is not attached rigidly to the platen, and during the first part of its operation it travels in a bearing through the platen for a distance of 7 in. On the completion of this travel the shoulder on this ram takes a bearing on the under side of the platen which causes the platen to travel upward. This causes the two side cylinders to fill by gravity from a surge tank.

When the platen and the main pressure ram are at the lowest point the blank holding plate of the latter fits into a recess machined in the face of the platen. During the first part of the operation the main pressure ram raises the blank holding attachment and later carries up the main platen as already described. It continues to move the blank holder and platen until the first operation is completed, when the operator turns the pressure into the side cylinders. This causes the platen to continue its upward travel free from the center ram and performs the second operation. The extension pressure head can be removed for work not requiring it. The platen and pressure heads are fitted with tee slots and the pressure head extension with slots for bolting on different forms.

The pressure capacity of the press is 68 tons, the press-



Hydraulic Forming Press Built by the Hydraulic Press Mfg. Company

ing surface is 38 x 38 in., the daylight space 9 in. or 22½ in., and the run of the ram is 18 in. The platen is constructed to allow for heating in necessary cases.

Automatic Tapping and Reaming Machine

High Production Machine for Finishing Valve Bodies, Return Bends, Etc.

A machine intended for finishing in one chucking semi-steel ammonia valve bodies, both flanged and screwed ends, also split return bends and similar work requiring two or three operations has been developed by the Pottstown Machine Company, Pottstown, Pa. The machine is of the upright type, of heavy construction, and may be styled a semi-automatic. The strong feature of the machine, in the opinion of its builder, is the rigidity of the parts, entirely eliminating the shift of work while the machine is in operation, which is not uncommon in turret machinery. The machine in equipped with eight spindles of which one or all can be used, according to the work to be machined.

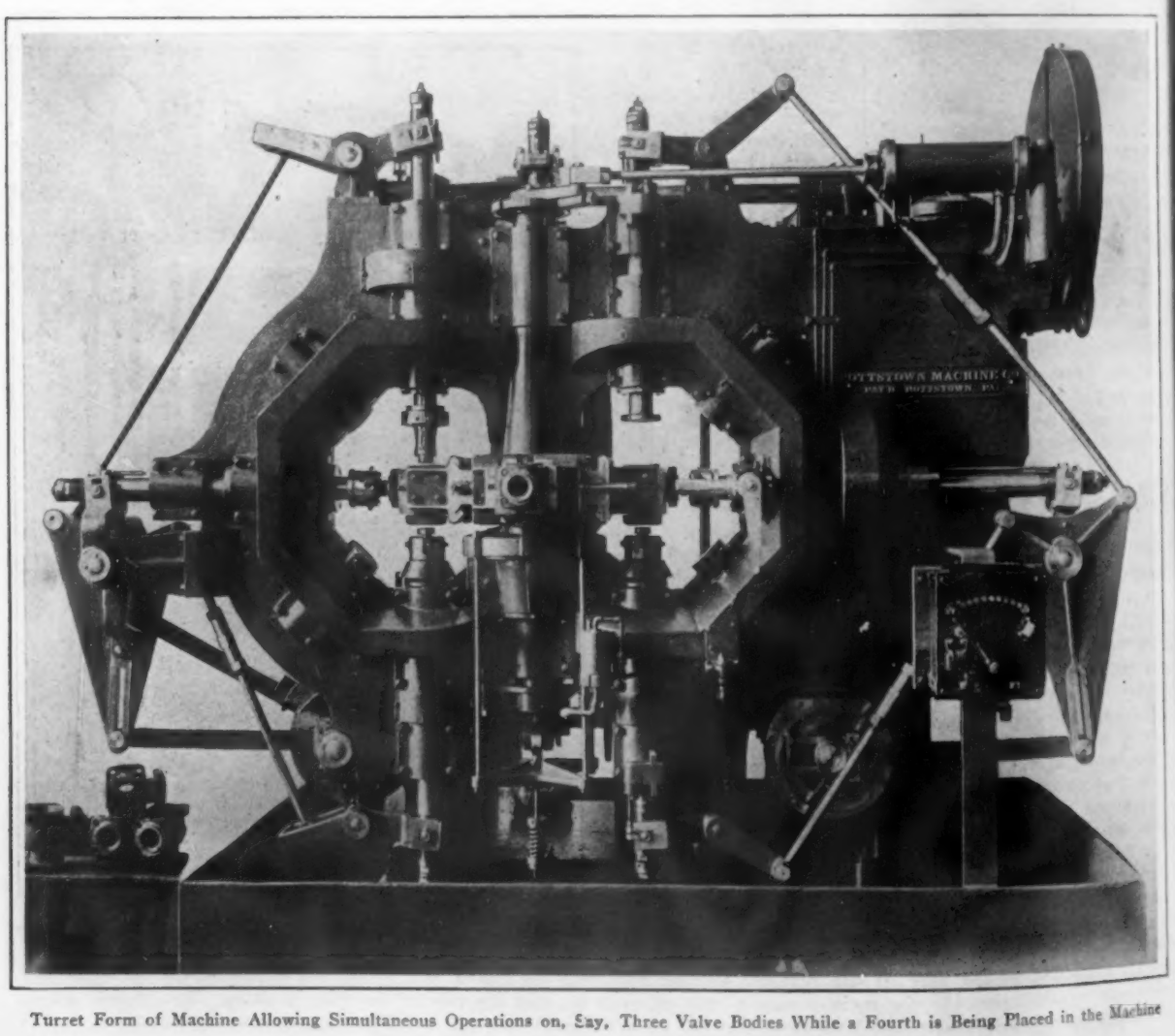
The turret is revolved and indexed by a pneumatic cylinder. The turret has four sides provided with four chucks, three of them being operated on while the fourth is being filled. The first operation is on the left where the three roughing tools enter the valve removing all scale surfaces. On the second movement of the turret this valve comes under the finishing tool which is located in the rear but does not show in the cut. Two spindles are provided in the rear, one horizontal and one vertical, providing a finishing tool for either style whether angle or straight through valve. On the third position of the turret the two facing tools finish the male and female openings. On the fourth movement the turret is brought around to the loading point where the finished fitting is removed and the new blank inserted. On the right-hand side is furnished an additional wrist plate, cam and lever mechanism. This is the tapping side of the machine. It is possible to throw the automatic reversing mechanism out of commission, making the spindles travel in one direction only, which permits placing finish facing tools in these spindles for flange work. The cut shows the machine operating in this manner. By disconnecting the wrist plate and placing lead screws on the spindles and throwing the reversing mechanism in commission the machine is ready for tapped openings.

While the turret is held and indexed by a substantial latch bar, it is further held by an automatic gripping device, to make it absolutely rigid with the main frame of the machine, and thus to insure alignment and accurate work. It is possible to revolve the turret entirely around without the tools operating on the work, as long as the cam trip has not been pressed down.

After the work is placed in the chuck and the turret is moved to its first position, the machine passes through the cycle finishing the piece. Once the tools have been set, there is nothing further to be done but to take out the finished work and put in the new blanks. The chucks, to secure rigidity, are provided with right and left screws coupled in the center with a sleeve to receive the two ends of the screws which have a square to fit this sleeve. The action of the wrench on the one end of these screws is to tighten the jaws on the fitting, which will then cause the screws to separate slightly in the middle and bring up solidly at each end of the chuck, not depending on a bracket or collar for rigidity.

Solid taps are used and the taps are fed in by adjustable lead screws. To facilitate gauging, the lead nuts are castellated and with a spring latch the nuts can be revolved from one notch to another, regulating the depth of thread. The lead screws are removable and can be readily changed for different pitches. The taps are started automatically by the cam shaft, but the reversing is done by the stop on the reversing disk. The depth of thread desired can be obtained by adjusting the stops. The variation in the threads is adjusted by the lead screws as explained.

As regards the advantages of the machine, mention may be first made of the fact that the work is brought close to the operator, giving him opportunity to secure



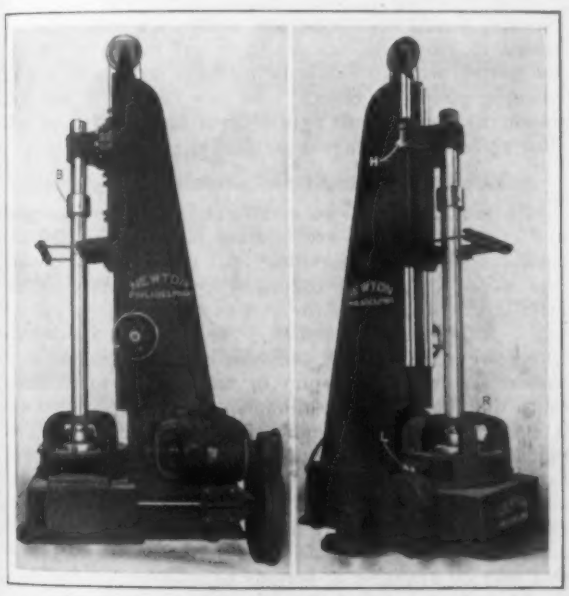
Turret Form of Machine Allowing Simultaneous Operations on, Say, Three Valve Bodies While a Fourth is Being Placed in the Machine

thorough chucking. In starting on a piece of work the turret can be moved back and forth to the different tools, thus doing all the trying and gauging on the first piece. The machine performing the third operation, it is emphasized, is a feature entirely new. For the machining of a globe valve body, it provides roughing tools to take off the stock and rough reaming, and finishing tools for accurately finishing all the openings, including the seat, with one chucking.

The gears are made of steel cast or forged with cut teeth; the clutches are made of tool steel and hardened, and the spindles are special spindle steel provided with taper sleeves and bushings for taking up wear; the bearings are provided with oil grooves and oil holes; working parts are arranged with a view to obtain quickness of operation, and the hand levers for the various movements of the machine are placed conveniently at the front. The output depends upon the material and the tools used. On the 2-in. semi-steel valve bodies the output obtained is 20 per hour, smaller sizes proportionately greater. The floor space of the machine is 9 ft. 6 in. by 6 ft. 1 in., and weighs 20,800 lb.

Boring Machine for Finishing Engine Liners

The Newton Machine Tool Works, Inc., Philadelphia, Pa., has recently designed and built a machine to finish gas engine liners of bushings, illustrated by the accompanying reproductions of photographs. The capacity of the machine is for bars up to 9½ in. in diameter and



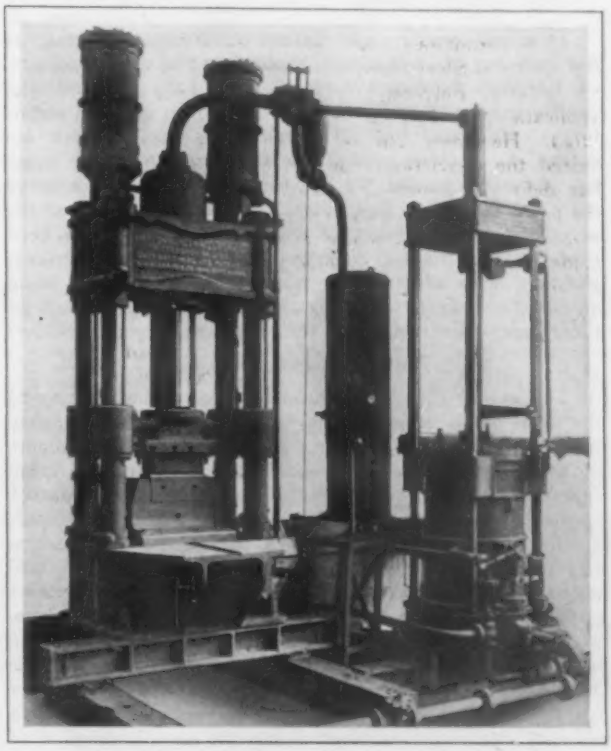
Two Views of Newton Machine for Finishing Gas Engine Liners

6 ft. in length. The bushings are clamped in bearings at the base of the machine, arranged to hold bushings to suit the varying diameters of the work to be bored. Boring is accomplished by means of the travel head B, mounted on the vertical boring bar, which is 6 in. in diameter. The boring head has power feeds and reversing fast power traverse, in addition to hand adjustment for inserting and removing the work quickly. The saddle is counterweighted and adjusted vertically by means of the hand wheel shown on the right-hand side of the machine and when in the top-most position the upper bearing hinged at H is swung clear of the bar.

Boring bars are attached to the large driving drum at the bottom, allowing the use of different diameter bars if desired. Automatic release to the head travel is located at R. The smaller motor shown drives the feed and fast power traverse and is a ½-hp. General Electric motor, running at 1800 r.p.m., and motion is transmitted through differentials controlled by lever L, which controls the feed when disengaged and the fast traverse when the drive is direct. The main drive for the machine is transmitted from the larger or 7½-hp. General Electric motor, which has a speed of 500 to 1000 r.p.m. The engagement of the drive to the spindle drum is through a bronze worm-wheel and a hardened steel worm.

Steam Hydraulic Press for Gun Forgings

A high-speed steam-hydraulic forging press has been built for gun forgings for installation at the Watertown Arsenal, Watertown, Mass., by the United Engineering & Foundry Company, Pittsburgh, Pa. It has a capacity of 800 tons and is almost a duplicate of one furnished the naval gun factory at Washington Navy Yard, Washington, D. C.,



Steam Hydraulic Press Built for the Watertown Arsenal

last year. As indicated in the accompanying illustration, it has a considerable depth of base at the press proper. This increased depth is to support mandril blocks 7 ft. apart for hollow forging work, and was attained by extending the upper face of the baseplate, which is a steel casting designed to carry the maximum load of the press at the span mentioned.

The installation consists of the press proper with main hydraulic cylinder and two hydraulic lifting cylinders at the left, the steam-hydraulic intensifier at the right equipped with the patented single-lever controlling gear, and the air tank or prefiller shown to the center. The picture was taken after a shop test and a gauge mounted on a standard is shown in front of the prefiller, registering by transmission through the fine copper tube connection the pressure between the dies.

Physical Examination of Workmen

For some time the Youngstown Sheet & Tube Company, Youngstown, Ohio, has been subjecting applicants for work to an examination for trachoma and other infectious eye trouble. It has now been decided by the company to enlarge upon its examination to the extent of securing a complete and accurate record of the physical condition of every man who is to be given employment. As soon as proper facilities are installed, such an examination will become part of the regular routine of the employment office.

James A. Campbell, president of the company, states that the prevalence of trachoma is becoming so common that for the protection of other employees from eye trouble some such steps are required. He says: "There are also other conditions, possibly not apparent, that render men unfit for work. Many enter the service of the company afflicted with hernia and after a term of employment it has to face the charge that such condition resulted from work in the plant. These and many other embarrassing situations must be met at the present time, and we are certain that with physical examination it will be better for us and the majority of men in the service of the company."

Uses of Blast Furnace and Coke Oven Gases

Their Practical Application at the Cockerill Works in Belgium —Developments Regarding Tar

In a voluminous paper before the Brussels meeting of the Iron and Steel Institute, September 1 to 4, E. Houbaer, of Seraing, Belgium, discusses very fully the practical applications of blast furnace and coke oven gases to metallurgy. He states that all metallurgists have by now acquired the conviction that the utilization of these gases has definitely passed the experimental stage and entered the practical. The conclusions he reaches are based on the investigations and practical applications which have been made at the Société Anonyme John Cockerill, Seraing, Belgium, with which he is connected, this company being among the earliest to investigate the possibilities of both of these gases. Extracts from the paper are presented below:

The Combustion of Gases

The author directs attention to a few rules relating to the combustion of gases and to the too marked tendency which currently obtains to form an erroneous estimate of the value of the gases themselves. Their true value depends solely on the temperature of combustion, a factor impossible to determine definitely, inasmuch as it depends upon the conditions under which that combustion occurs, and it is precisely those variable conditions which it is necessary to determine in order to obtain the greatest possible yield from the fuel employed. The writer has ascertained by Mr. Le Chatelier's method the figures for blast-furnace, gas-producer and coke-oven gases, and the analyses given below are for the gases available at the Cockerill works. The factors have been calculated, in each instance, not on the assumption that the gases undergo neutral combustion, but with the admission of 25 per cent. of air in excess.

Composition of the Gases

Constituents	Coke-oven gases, per cent.	Producer gas, per cent.	Blast-furnace gas, per cent.
Hydrogen	57.00	12.00	3.00
Carbon monoxide	6.00	19.00	26.00
Carbon dioxide	2.00	8.00	11.00
Methane	23.00	2.00	.....
Nitrogen	12.00	59.00	60.00
Total	100.00	100.00	100.00

Coke Oven Gas

Minimum calorific power	3761 cal.
Minimum calorific power with condensed steam	4212 cal.
Temperature of combustion, gas unheated, air heated to 1000 deg.	2165 deg.
Temperature of combustion, gas unheated, air heated to 600 deg.	1940 deg.
Temperature of combustion, gas unheated, air heated to 400 deg.	1825 deg.
Temperature of combustion, gas unheated, air unheated	1600 deg.
Volume of air of combustion corresponding to one volume of gas (including the 25 per cent. excess)	4.88 vol.
Volume of smoke (including the 25 per cent. excess)	5.48 vol.

Blast Furnace Gas

Minimum calorific power	873 cal.
Minimum calorific power with condensed steam	891 cal.
Temperature of combustion, gas unheated, air heated to 200 deg.	1325 deg.
Temperature of combustion, gas unheated, air heated to 600 deg.	1465 deg.
Temperature of combustion, gas unheated, air heated to 800 deg.	1540 deg.
Temperature of combustion, gas heated to 600 deg., air heated to 600 deg.	1695 deg.
Temperature of combustion, gas heated to 900 deg., air heated to 900 deg.	1920 deg.
Volume of air of combustion corresponding to one volume of gas (including the 25 per cent. excess)	0.91 vol.
Volume of smoke (including the 25 per cent. excess)	1.76 vol.

Producer Gas

Minimum calorific power	1068 cal.
Minimum calorific power with condensed steam	1135 cal.
Temperature of combustion, gas heated to 600 deg., air unheated	1530 deg.
Temperature of combustion, gas heated to 600 deg., air heated to 400 deg.	1680 deg.
Temperature of combustion, gas heated to 600 deg., air heated to 600 deg.	1760 deg.
Temperature of combustion, gas heated to 900 deg., air heated to 900 deg.	1980 deg.
Volume of air of combustion corresponding to one volume of gas (including the 25 per cent. excess)	1.22 vol.
Volume of smoke (including the 25 per cent. excess)	2.06 vol.

This puts us in possession of the factors necessary for the comparison of these fuels. In order to throw into relief the valuelessness of the conception of the calorific power, the temperature of combustion of the producer gas with 1068 calories may be instanced, when the gas and air are heated to 900 deg.; that is to say, 1980 deg. as compared with the temperature of combustion of the coke oven gas, with 3761 calories, which is only 1940 deg. when this gas is employed cold and the air of combustion is heated to 600 deg. It is, however, unnecessary further to emphasize this point; the figures given above speak for themselves.

If, therefore, it be desired to ascertain the value of a gas, it will differ according to the mode of its utilization and the use to which it is to be put. An absolute value does not, therefore, exist. The only point of interest in a given case is its relative value as compared with another fuel, and, in particular, in comparison with the fuel, and, generally speaking, the method of heating employed in any given case; it is this conception that enables one to ascertain whether there is any economy in substituting such and such a fuel for another hitherto employed; or such and such a method of heating for another. For example, is it an economy to substitute in an existing open-hearth furnace, a cold coke-oven gas, using as a combustible air heated to 1000 deg., for producer gas heated to 900 deg. and burned with air similarly heated to 900 deg.? Such an example possesses reality, and this is why it has been sought to express it in figures, and thus to show the conclusions to be drawn from the factors given above.

Variations in Supply and Composition of Gases

No illusion should be entertained; blast furnace gases and coke oven gases are nothing more or less than by-products. First and foremost it is necessary to manufacture good commercial coke and good pig iron, and the metallurgist must make the best of the fuel given him and use it with all its impurities. Variations in the chemical composition and in the pressure of the gases will make themselves felt. An injury or an accident to the mains or to the apparatus may diminish the output or even stop it entirely; every eventuality must be foreseen and provided for in such a manner that no inconvenience need be experienced at any given moment. It is needless, however, to overstate the case. It is obvious that the application of gas in metallurgy must be effected in a reasonable manner without seeking to exhaust the maximum amount that may be available at periods of inclusive production at the blast furnaces and the coke ovens. It is precisely in knowing the utilizable percentage that the key to the continuous application of metallurgical gases lies; the stoppage of a furnace or the irregular working of a battery of coke ovens may lead to enormous fluctuations in the output, according to the proportion of the production affected by such accidents. In a large iron works comprising several blast furnaces and sufficient coke oven batteries to feed them the influence of such a momentary stoppage will be reduced to a minimum, and the quantity of gas almost certainly available in any eventuality represents a high percentage of the amount available during intensive working. In small works circumspection would be required, and it would almost always be necessary to provide for, at least in regard to certain applications, two methods of heating so arranged that it would be possible to change over rapidly from one fuel to the other. These remarks cannot, however, in any case be regarded as constituting an objection to the use of waste gases; they will always come to the aid of those who know how to use them, and their existence will, in any case, allow of an appreciable saving in coal.

Blast Furnace Gas

Numerous arguments have been brought forward in connection with the direct utilization of blast furnace gas in the engines of the central electrical power station, compared with its combustion beneath boilers supplying steam

groups of turbo-generators. Without entering into this discussion it will suffice to instance the introduction of engines taking poor gases in most of the large metallurgical works as the best proof of the enormous advantages which may be obtained from gases employed in this way.

Trials carried out with the most minute care by the Cockerill Company have shown that the consumption in engines actually using blast furnace gas was 2300 calories per electric horse-power. A calorific power averaging 875 calories per cubic meter of gas is assumed.

If it be desired to calculate the value, in coal, of a cubic meter of gas used in the central station, it will be found that the consumption is $\frac{2300}{875} = 2.63$ cubic meters of gas per electric horse-power. On the other hand, assuming that a good boiler produces 8 kilograms of steam per kilogram of coal, at 20 francs per ton, and that this steam supplies a good turbine at the rate of 5 kilograms per electric horse-power, we find the equivalent to be:

One electric horse-power = 1.2 centime of coal = 2.63 cubic meters of gas, from which the price one could afford to pay for cubic meter of cleaned gas will be found to be 0.46 centime.

It is therefore reasonable to supply the needs of the works for motive power (electric generator groups, blowing engines, rolling-mill engines, pumps, compressors, etc.) by means of engines supplied with blast furnace gas whenever the employment of such engines is possible.

The surplus, if it exists even momentarily, will be used either under boilers, or, better still, in regenerative heating furnaces, or in metal mixers. Mention may be made, in passing, of the use of blast furnace gas in the foundry for drying molds and cores, and to the multifarious applications of a similar nature to which a burner, so readily installed, may be put, and to note that it is necessary, in order to avoid all danger of poisoning, to render escapes of gas appreciable to the sense of smell.

Coke Oven Gas

The whole of this gas would be available if the blast furnace gases alone were employed in engines. It could be made to supply all sorts of appliances, from a simple stove to furnaces of very high temperatures. In this paper the use of coke oven gases in engines is not advocated. Such engines work very satisfactorily, but the quantity of calories corresponding to one electric horse-power appears slightly higher than the corresponding figure in the case of blast furnace gas.

Trials undertaken by the Cockerill Company on an engine supplied to the Ressaix collieries gave the same value of 2300 calories, but allowing in practice three-fourths of the charge, corresponding with 2500 calories per electric horse-power, and an average calorific power of the gas, equal to 3600 calories, the value, in terms of coal, of a cubic meter of gas used in the engines will be given by the equation:

One electric horse power = 1.2 centime in coal = 0.70 cubic meter of gas. One cubic meter of gas = 1.7 centime.

We know that, in comparison with the value of producer gas, an open-hearth furnace can afford to pay at a rate of 1.4 centime per cubic meter, but practice has shown that in this application the calorific yield of the coke oven gas was greatly above that of the producer gas. In short it is obvious that in such a case, where high temperatures of working are necessary it is better to employ a gas capable of giving very high temperatures of combustion. Its application for drying molds in the foundry is not possible, owing to the presence of water formed by the combustion of the hydrogen it contains. There is a simple means, although unfortunately a somewhat costly one, for obtaining a reserve in the event of stoppage or of accidents, that is, the employment of a gasometer.

For the utilization of this coke oven gas, which is so valuable and at the same time so rich, and the true value of which has probably not even yet been fully appreciated, such a solution possesses great advantages and is almost a necessity. The chief advantages are: 1. The possibility of recovering at least a portion of the gases produced on Sundays and holidays. 2. Equalization of the pressure and composition of the gas. 3. A reserve in the case of stoppage or of temporary slowing down in the output from the coke ovens. For certain purposes there may also be included among the number of the advantages the absence of sulphur, resulting from the necessary purification previous to passing the gases under the gas bell.

How the Gases are Used at Seraing

The following is a description of the utilization of blast furnace and coke oven gases as practiced at the present time by the Cockerill Company:

Blast Furnace Gas.—The company possesses seven blast furnaces of a total daily productive capacity of 1000 tons of pig iron.

The amount of gas thus available, reckoning 60 per cent. to be absorbed in the blast furnace service and in leakages, is, daily, at the rate of 4500 cu. m. per ton of pig iron,

$$4500 \times 1000 \times 0.4 = 1{,}800{,}000 \text{ cubic meters,}$$

or 75,000 cu. m. per hr., or, allowing an average calorific power of 875 cal. per cu. m. of gas, 65,625,000 cal. per hr.

The motive energy available in this gas is therefore

$$\frac{65{,}625{,}000}{2300} = \text{about } 28{,}500 \text{ electric hp.}$$

The utilization of this reserve is distributed as follows:

6 central power-station motors of	1250 hp	each =	7500
2 central power-station motors of	900 hp	each =	1800
2 central power-station motors of	200 hp	each =	400
1 central power-station motor of	6500 hp	=	6500
1 steelworks blowing-engine of	2400 hp	=	2400
Total			18,600

The surplus is at present used in the batteries of boilers fitted either for gas heating or coal firing, which serve as a stand-by in the event of the stoppage of a furnace. A portion of the reserve is also earmarked for the future heating of a metal mixer.

Coke Oven Gas.—The coal treated at the Cockerill works contains on an average 23 per cent of volatile matters and 5 to 6 per cent. of moisture. Its yield of coke is 75 per cent.

Batteries I and II treat about 225 tons of coal and produce about 170 tons of coke.
Batteries III and IV treat about 480 tons of coal and produce about 360 tons of coke.
Battery V treats about 360 tons of coal and produces about 270 tons of coke.
Total, 1065 tons of coal produce about 800 tons of coke.

A sixth battery of the same capacity as battery V is contemplated in the near future.

Only the last battery employs regeneration. The others are simply by-product ovens. The amount of gas available may be calculated by assuming an evolution of 280 cu. m. of gas per ton of coal, and 10, 25, and 50 per cent. excess for the three types of oven. This quantity is equal to about 90,000 cu. m. per day, or about 3740 cu. m. per hr. The utilization is actually distributed as follows:

	Averaging per hr.
One 9-ton open-hearth furnace	520 cu. m.
One 12-13 ton open-hearth furnace	600 cu. m.
Two stoves	90 cu. m.
Two reheating furnaces	450 cu. m.
Two 500-hp electric motors	750 cu. m.
One 1000-hp electric motor	750 cu. m.
Two motors (extractors) 50-hp	100 cu. m.
One motor (compressor) 600-hp	440 cu. m.
Total	3700 cu. m.

That is to say, commercially speaking, the whole of the gas reserve is fully utilized. Battery VI, which will give about 2000 cu. m. of additional gas per hour, will allow of supplying two open-hearth furnaces of 20 tons each, or a certain number of reheating furnaces.

Gasometer.—The following particulars relate to the installation of a 50,000 cu. m. gasometer and its accessories, the building of which, by the Cockerill Company, is in progress:

The gasometer, which is 50 m. in diameter, comprises three telescopic sections which raise the hight to about 40 m. Its weight is adjusted so as to maintain a minimum pressure of 175 mm. of water, and the pressure rises to 275 mm. when the three sections are in operation. It is situated in proximity with the calcining kilns and to the coke oven gas central power station, but at a distance of about 1200 m. from the rest of the works, with which it is connected by a main 300 mm. in diameter.

[Mr. Houbaer then discusses the general application of the two waste gases to metal mixers, open-hearth furnaces and heating furnaces, giving practical results in each case. In regard to reheating furnaces he states that generally

speaking the utilization of metallurgical gases is economically possible in them and has already been successful.]

Tar as a Fuel

There is a fuel, a by-product of metallurgical works, which is worthy of attracting the attention of business men. I refer to tar. Its use in Diesel engines may furnish an instance, for central station use, when blast furnace gas is lacking. On the other hand, its high calorific power, 8000 calories at a minimum, permits of its use, with the most valuable results, when powdered, in special burners, by means of steam and compressed air, for heating industrial furnaces of all kinds, and even open-hearth furnaces. It may be used either in the state of pitch or in the form of a heavy oil derived from the distillation of the raw product. Comparing the calorific powers of pitch and of unrefined petroleum, A. P. Scott [*The Iron Age*, September 7, 1911] estimates the consumption of pitch in an open-hearth furnace at about 200 kg. per ton of steel. Now, assuming the production of pitch at 22 kg. per ton of coal treated in a coke oven, the quantity recovered, by, for example, the Cockerill Company, would allow of the entire supply of two 15-ton open-hearth furnaces. Even now an addition of tar is employed in current practice at the open-hearth furnaces whenever it is required, in certain cases, to increase the temperature of combustion, and its use, alone, has been achieved, in which connection it suffices to refer to the Gary works, where two 60-ton furnaces are supplied by these means.

In connection with furnaces of every description intended for metallurgical uses, the employment of pitch as fuel is making enormous headway, and its applications tend to invade every domain of industry. It would therefore be proper for all manufacturing works to seek all possible uses for this by-product, and consume it on the spot.

Conclusions

To sum up in figures the advantages to be derived from metallurgical by-products, the author may instance the case of a works producing on the one hand 1000 tons of pig iron and on the other 1000 tons of coke in regenerative heating ovens.

The blast furnace gases will supply motive power equal to 28,500 hp.

The daily quantity of coke oven gas available would allow of the production either of 625 tons of steel in open-hearth furnaces or the raising to the proper temperature of 1150 tons of ingots or semi-manufactured products in reheating furnaces.

On the other hand, the pitch recovered would be capable of producing 150 tons of steel in an open-hearth furnace.

In conclusion, the tendency of metallurgical works producing coke and pig iron, and converting the latter into steel, and rolling it in their own mills, should be to cover their fuel requirements solely by the coking coal required for the supply of their smelteries. This is obviously the ideal to which a greater or lesser degree of approximation is being made according to the varied circumstances which intervene in the most economical running of the plant. It is nevertheless a certainty that in nearly all works useless waste of fuel occurs, which the careful examination of every possible application would serve to avert.

The Brier Hill Steel Company, Youngstown, Ohio, has put in successful operation at its new open-hearth steel plant the boilers and two 1500-kw. turbo-generators for the purpose of furnishing power and light to the new works. A shipment was recently received of 35 carloads of crane equipment from the Morgan Engineering Company, Alliance, Ohio, and another crane shipment of about the same size is shortly to be made by the same builder.

In the official report on mining operations in the province of Quebec for 1912 it is stated that for the first time in many years there was no production of iron ore recorded for that year. Production of bog iron ore, formerly mined quite steadily and charged into the charcoal furnaces of the Canada Iron Corporation, ceased, resulting in a shutting down of the blast furnaces at Drummondville and Radnor. The pig iron that was produced there was of a high-grade charcoal iron exclusively.

Electric Smelting of Iron and Copper Ores

In an extensive paper prepared for the recent Butt meeting of the American Institute of Mining Engineers Dorsey A. Lyon and Robert M. Keeney, Pittsburgh, dis cuss "The Smelting of Copper Ores in the Electric Fur nace." The concluding paragraphs of the paper refer a follows to the contrasts in the application of the electri furnace to the smelting of iron ores and copper-bearing ores:

"Summarizing, then, we may say that the electric smelt ing of copper ores is nothing more than the substitution of electric heat for the heat derived from the combustion of carbon. Inasmuch as the carbon which is used either in the reverberatory furnace or in the blast furnace plays no important part in the necessary reactions which take place in these furnaces, there is no reason metallurgically why electric heat may not be substituted for the heat derived from the combustion of carbon. In fact, as we have tried to point out, in some cases the reactions would take place to better advantage in the neutral atmosphere of the electric furnace than in the reducing or partly reducing at mosphere of the combustion furnace. Therefore, as to whether the electric furnace would be used for the smelting of copper ores would largely depend, so far as we are able to make out at the present time, upon the relative cost of coke and electric power. As the use of the electric furnace is not advocated as a competitor of the combustion furnace, but as a substitute for it in those localities where it is not advisable because of the high cost of fuel we see no reason why the electric furnace may not be developed as a substitute for the combustion furnace where the conditions are such as to warrant its use, especially in the treatment of copper-bearing ores. In this connection it is to be remembered that the development of the electric furnace in the iron industry, for the reduction of iron from its ores, was due to necessity. As a matter of fact the field for the electric furnace in the reduction of iron from its ores is a limited one. Perhaps the same is true as regards the possible application of the electric furnace to the treatment of copper ores, but, judging from the comparative costs it would seem that the chances in favor of the electric furnace for the treatment of copper ores are greater than those for the treatment of iron ores because there is not so great a difference in the cost of coke and electric power in copper mining districts as in iron smelting centers. Also the cost of electric power is constantly becoming less, due to improvements in gas engines and steam turbines, so that, in districts where water power is not plentiful but cheap fuels unsuited to coking purposes are available, it may be found more advantageous to use electric heat than the heat derived from the combustion of coke.

"As a result of their investigations the writers are convinced that experimental work on a larger scale should lead to the development of an electric blast furnace, which in some cases could be used to better advantage for smelting sulphide ores of copper than the combustion blast furnace."

The Titanium Alloy Mfg. Company has issued its second booklet entitled "Rail Reports, Bulletin No. 2." The first dealt with the results of the complete tests of one set of five samples of plain and titanium-treated open-hearth steel. The second report covers complete tests, chemical, physical and microscopic, on three of the four sets of which sulphur prints were shown in Bulletin No. 1, or three more of the remaining samples. The same general conclusions are arrived at regarding the essential differences between the two rail steels as to homogeneity, segregation, ductility, impact and dynamic resistance, to the advantage of the titanium-treated steel. The method of preparing sulphur prints is given in detail. A feature of this bulletin is the collection of very excellent photomicrographs, 36 in all, showing various portions of the head, web and flange.

A monograph on electric hoisting plants has been issued by the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., as catalog 3002-A. The pamphlet is largely a mathematical explanation of acceleration and retardation, friction and balancing in hoisting with cylindrical drums.

Workmen's Dwellings of Krupp Works

Late Arrangements Including Housing for the Unmarried Men

An interesting feature of the recent visit to Germany of the American Society of Mechanical Engineers was an inspection by a number of them of the arrangements provided by the Friedrich-Alfred-Hütte plant of the Krupp Company for the welfare and housing of its employees. Directly connected with the Friedrich-Alfred-Hütte plant are several colonies, that of Margarethenhof consisting of 469 dwellings, that of Weddau near Duisburg having 40 dwellings, besides other scattered rented or purchased houses amounting to 174. The arrangements for officers consist of a colony of 19 dwellings at Bliersheim and 17 other scattered ones. These total 719 houses. In addition there are three dormitories and one eating hall for unmarried workmen accommodating 720 persons.

The building of the workmen's colony at Margarethenhof was commenced in 1903. The houses are entirely of the cottage style, accommodating one to four families, the general character of which is shown in one of the accompanying illustrations. Each house has a cellar and a drying loft, as well as a garden, often with stalls for pigs, goats, chickens, etc. Front and back verandas are provided for many of them, but only the dwellings having five or more rooms have laundries. These comfortable

Workmen's Dwellings at Margarethenhof

Residences of Officers

homes rent from 60 to 65 marks per room per year. Located in the domains of the colony are stores and a beer hall.

The houses of the officers' colony, the building of which was also begun in 1903, are likewise of the cottage type. A characteristic view of these is also shown. They are constructed as single, double or four family houses, each with a separate entrance and each house has a garden. A striking feature of this colony is its casino, devoted to the pleasure and entertainment of the officers. The style of this building is shown in one of the cuts. It has a very pleasant reading room equipped with the current periodicals, and a commodious and attractive restaurant, where meals can be secured at a reasonable rate.

But one of the most interesting features of the unusual

Workmen's Dining Hall

The Officers' Casino

arrangements in general welfare work made by this company is the housing of its unmarried employees. For this purpose there are three dormitories, one built in June, 1904, one in March, 1905, and the third in July, 1906. These three buildings contain 220 beds, usually with several beds to a room. Besides these arrangements there are numerous so-called cabins or berths. The expenses for the accommodation of each man per day in these dormitories range from 29c. to 36c., depending on the room. In June, 1904, the company opened a restaurant having one large and two small dining rooms, a kitchen and different store rooms. In 1908 the restaurant was enlarged to accommodate 444 persons. At present at least 700 avail themselves of the advantages of the restaurant, comprising not only those living in the dormitories, but also those located in the not too distant neighborhood, who take all or part of their meals there. A view of a portion of the dining room is shown, revealing the simple and neat decoration and trim of the place. The kitchen is a model in its equipment and arrangement. The restaurant also takes care of the sick and injured workmen located in the neighboring small hospital of 17 beds.

A small oxy-acetylene installation made recently by the Walter Ellinger Company, Sheboygan, Wis., probably saved the Crocker Chair Company $5,000. The largest planing machine in the chair shops was broken and the managers faced the purchase of a new machine at $2,500 and the loss of about the same amount in time and production until a new machine could be installed. The welding concern offered to make repairs, and in less than two hours the machine was again in operation.

New Electric Furnace of the Induction Type

Transformer Cores Horizontal Instead of Vertical —Heating Channels Always Full of Molten Metal and Thus Are Not Attacked by Slag

BY C. H. VOM BAUR

A new electric steel furnace of the induction type has recently been patented by W. N. Crafts, president Crucible Steel Forge Company of Cleveland, Ohio, which is quite revolutionary in some of its features. Ever since De Ferranti in January and Colby in April of 1887 independently applied for patents for an induction furnace, all the improvements, made for the next 24 years, embodied the original position of the hearth and heating rings. Even Gin, with his novel induction furnace design, could not get away from this idea. This well-known position, having the hearth and rings in the horizontal plane, is also found in the typical Kjellin and Roechling-Rodenhauser induction furnaces. These prevailing furnaces inherit the one objection that they do not have a hearth of rectangular or circular shape which is wholly unobstructed. To be sure the Roechling-Rodenhauser and Hiorth furnaces to a certain extent accomplish this by placing two rings together, in such a way as to form the figure eight where the waist of the eight is the hearth, about 7 ft. long and 18 in. wide. In these furnaces the narrow heating channels, completing the figure eight and the electric circuit, are kept free from slag by skimming bricks.

It was not until Mr. Crafts in United States Patents Nos. 1,069,923 and 1,069,924, broke the tradition of the prevailing type of induction furnace by turning the rings 90 deg. and changing the proportions, that a plain open hearth above the channels was obtained. This plain open hearth, as illustrated by Fig. 1, easily accessible and easily surveyed, is what all iron and steel manufacturers have been waiting for. This is also shown in the vertical section, Fig. 2, and the vertical transverse section, Fig. 3, from which it is evident that the resultant hearth is plain and rectangular as in the best open-hearth furnaces.

The simplicity of the Crafts hearth brings with it the fact that the bottom and sides may be made just as sloping as in any open-hearth furnace and hence repairs can readily be made at the slag line between heats, which is not the case with other induction furnaces. Even so 164 heats on one lining have been made with cold charging and 492 heats with hot charging in a 4-ton Kjellin basic furnace (*The Iron Age*, Nov. 30, 1911.) With a little experience in ramming and baking in the basic or acid refractories these figures should soon be exceeded, since the slag is entirely above the channels and will not touch even the top of channels when the heat is poured. It has been conclusively proven in the electric furnace practice of European steel works that where the slag is kept out of the heating channels there is scarcely any wear of the lining, showing that the chemical action of the slag causes the wearing away of the bottom and sides, and not the rotary motion of the molten metal in an induction furnace. It is, therefore, anticipated from all past experiences that these U-shaped channels formed in the magnesite below the hearth will last through a campaign several times as long as has heretofore been obtained in other types of induction furnaces.

As the slag does not attack the heating channels in a Crafts furnace, and as they are always filled with molten metal, the temperature variations in them are less than if they were only half filled at times, and the possibility of the inner refractories cracking is very remote.

The third great advantage of the Crafts furnace is that at no time is it possible for any slag or broken brick to enter the heating channels which are kept full of metal even when tapping the furnace.

Furthermore, since the heating channels are always filled with metal to their full capacity the power factor of the furnace will be constant at all times during a heat, and by a proper design of the hearth and control in tilting it will be possible, if desired, to keep full current flowing even during pouring, repairing and charging. These two electrical features will be of decided advantage in obtaining increased electrical efficiency and a better power load for the generating plant.

Since the furnace has the simplest hearth, the roof may have the simplest and strongest construction, as the transformer core and primary lie entirely beneath the bath. The roof is hence much stronger, more durable and cheaper than for any electric arc furnace, or any gas-fired open hearth, as the heat comes not from above, as in these two types of furnaces but entirely from below. Air cooling is entirely sufficient for the electrical and magnetic parts.

The circulation of the metal should be even better than in the earlier induction furnaces as the hotter metal in the channels will rise to the surface and meet the slag. The refining should be rapid, as the rate depends on the temperature at the point of contact between the metal and the slag, and the rapidity with which the entire metallic contents of the bath can be brought into contact with the slag. The thermal efficiency, already high in its prototype induction furnaces, should be even higher since the slag line is fully one-half less for the same tonnage size, and the radiation from the vertical heating channels formed in the magnesite hearth is less than it is for induction furnaces having the channels in a horizontal plane. The design allows an easy accessibility to the electrical and magnetic parts and at the same time so locates them that they are entirely below the working platform of the furnace. The bath is even more accessible and easy of working than that of the usual open-hearth furnace, since working doors can be provided on all four sides, while the open-hearth

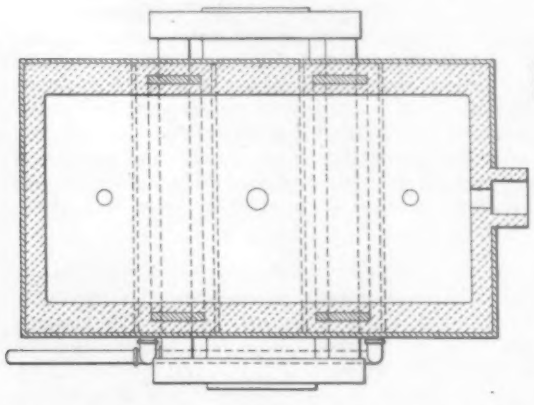


Fig. 1—Horizontal Section Showing Similarity to Open-Hearth Bath

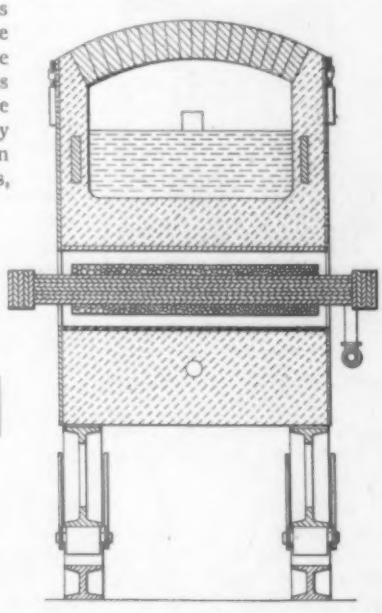


Fig. 2—Vertical Section

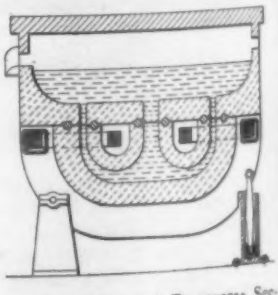


Fig. 3—Vertical Transverse Section

VARIOUS SECTIONS OF THE CRAFTS NEW ELECTRIC INDUCTION FURNACE

bath can be worked from front and back only and generally only from the back.

Fig. 2 shows a variation of the design which will operate as a two-phase furnace from any three-phase circuit having the proper frequency, by means of the well known Scott connection. The single-phase furnace is a trifle cheaper, having only one magnetic yoke in place of two for the polyphase furnace.

By all those who have operated induction or arc furnaces or by those contemplating doing so this design should be welcomed for its greater simplicity, operating as it does along well known lines which have proven practical in service for over a decade.

Analyses of Rust from Corrosion of Iron

Some data on the corrosion of iron are contributed to the Engineering Record of September 6, 1913, by the Henry S. Spackman Engineering Company, Philadelphia, Pa. The results were obtained in an investigation of corrosion in a hydroelectric plant. It was thought that analyses of the rust might be of interest, showing whether acids, if present in the water, would also be present in the rust. Five samples were analyzed. It was assumed that these would contain occluded clay matter or silt in addition to products of corrosion, and the samples were treated with dilute hydrochloric acid, the insoluble portions, consisting of silt or clay matter, being analyzed separately. The analyses resulted as follows:

Insoluble in Hydrochloric Acid

Description of sample	Turbine shutters	Steel screen	Cast-iron pipe	Connecting rod	Wrought-iron pipe
Silica (SiO_2)	2.80	10.16	4.84	15.96	2.90
Alumina and iron oxide (R_2O_3)	1.44	4.60	2.44	5.76	1.52
Lime (CaO)	None	None	None	None	None
Magnesia (MgO)	None	None	None	None	None
Sulphuric anhydride (SO_3)	None	None	None	None	None

Soluble in Hydrochloric Acid

Silica (SiO_2)	0.72	0.40	0.44	0.24	0.76
Ferric oxide (Fe_2O_3)	67.92	62.24	65.34	55.20	77.84
Alumina (Al_2O_3)	None	None	None	None	None
Lime (CaO)	None	None	None	None	None
Magnesia (MgO)	None	None	None	None	None
Sulphuric anhydride (SO_3)	1.22	2.16	1.83	1.36	2.36
Carbon dioxide (CO_2)	None	None	None	None	None
Water (H_2O)	26.28	21.28	24.72	22.24	[illegible]

From these results it will be noticed that the rust samples consist largely of hydrous oxide of iron, together with occluded matter and small quantities of sulphate of iron. There were 1 to 2 grains of sulphuric anhydride per U. S. gallon in the water used at this plant. The corrosion was very extensive and appeared to become much more rapid when a spongy coating of rust had formed. So far as known these analyses of rust are the first ever published. An examination of considerable literature did not bring any to light.

The World's Stock of Copper September 1

The receipt of European statistics of copper stocks from Henry R. Merton & Co. Ltd., London, England, affords the opportunity to compile figures showing the quantity of copper in stock in Europe and America September 1. According to the Merton figures, the stock in England and France, and afloat thereto from Chili and Australia, was 26,506 gross tons, which is a reduction of 1838 tons from the figures of August 1; the stock in Holland and Germany was 7539 tons, showing a reduction of 256 tons. In our own country the stock September 1 was 17,104 tons, which is a reduction of 6822 tons as compared with the stock on hand August 1.

The total visible supply of copper in Europe and America, September 1, was 51,149 tons, which is a reduction of 8404 tons as compared with August 1. This is by far the lowest stock on hand since the American Producers' Association began to publish the figures of the stock in this country. The high mark in the visible supply of the world was attained April 1, 1911, when the quantity on hand was 171,892 tons. From present indications the world's visible supply is likely to continue low for some considerable time.

The Sawyer-Massey Company, Ltd., Hamilton, Ont., has sent a shipment of 13 carloads of engines, threshing machines and gasoline tractors to Argentina.

Coal Production of Illinois in 1912

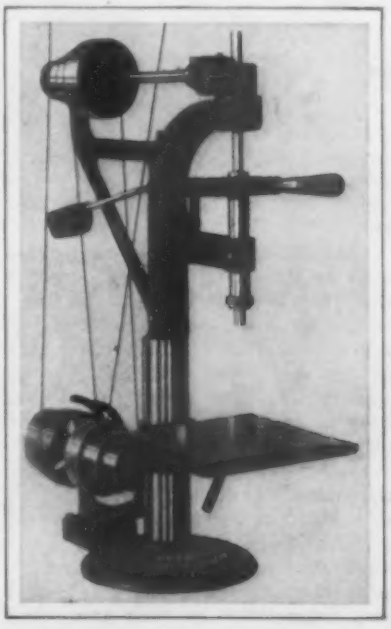
The production of coal in Illinois in 1912 reached the great total of 59,885,226 net tons, with a value at the mines of $70,294,338. These are record-breaking figures for the State, according to E. W. Parker, the coal statistician of the United States Geological Survey. The production in 1912 reached the highest record ever attained, exceeding the previous maximum, 53,679,118 tons, made in 1911, by 6,206,108 tons, or 11.6 per cent. The value increased $10,774,860, or 18.1 per cent. The increased labor efficiency is exhibited by an average output per man in 1912 of 767 tons against 701 tons in 1911.

There are 102 counties in Illinois, and coal is mined in just one-half of them. The coal formations underlie a number of other counties, the total productive territory occupying nearly three-fourths of the entire State. The total coal area is estimated at 35,600 square miles, a larger area than in any other state east of the Mississippi River. The Illinois coal fields comprise the western part of a broad, relatively flat basin whose eastern border is in the western part of Indiana and whose southern extremity extends under the Ohio River into Kentucky.

In spite of the increase of over 6,000,000 tons in 1912, Illinois still fell below West Virginia in tonnage and continued third in rank among the coal-producing states With regard to the value of the output, however, Illinois beat West Virginia by more in dollars than it was surpassed by that State in tonnage. West Virginia's output in 1912 exceeded that of Illinois by 6,901,461 tons, whereas in value Illinois had the advantage by $7,502,104. The explanation lies in the fact that the operators of Illinois are favored with large consuming markets close at hand, while the producers in West Virginia must ship their output to distant points with the disadvantage of transportation expenses. The average price per ton in Illinois in 1912 was $1.17, against $1.11 in 1911. The average price for West Virginia coal in the two years, respectively, was 96 cents and 90 cents. In fuel value West Virginia coal will average about 20 per cent. higher than that of Illinois.

A 12-In. Ball Bearing Bench Drilling Machine

The Peerless Drill Company, Rockford, Ill., has recently designed and built a new type of 12-in. ball bearing bench drilling machine which is illustrated herewith. The spindle is driven by spiral gears and runs at the rate of 1000 r.p.m. The table is built somewhat larger than usual to provide ample room for any jigs that may be put on. In a recent test of the machine it was driven by a piece of light twine and drilled through a 1-in. casting with a No. 31 drill in 45 sec. In addition to this type of drill, the company is also building a machine with adjustable self-oiling plain bearings. The company also makes tapping and filing machines and is a successor to the Peerless Machine Company. W. B. Johnson is president and treasurer.



A Recently Developed 12-In. Ball Bearing Drilling Machine for Use on a Bench

The city of East St. Louis, Ill., has adopted the policy of according to new plants locating in the city freedom from city taxes for 10 years. Two large plants have already been obtained by the concession.

Shop Costs of Boiler and Plate Work *

Boiler Makers Overlook Essential Factors—Importance of Overhead Expense

BY W. C. CONNELLY†

We have in the manufacture of boiler-shop products three principal articles that enter into the cost, namely, material, labor, and overhead expense. It is an easy and simple matter to obtain the exact cost of the material entering into any job. In obtaining our labor cost, there are various methods, some of which are good and others, in my opinion, of not much value; but, as I hope that not later than our next convention some one will go into this subject in detail, I will assume that all boiler manufacturers have a good method of arriving at their labor cost. As to the third item, known in a general way as "overhead expense," it seems to me that boiler manufacturers in general have not placed enough importance upon this subject, learned enough about it, or determined what relation it bears to our business in general; that is, its relation to our shop pay-roll and to material purchased.

No doubt one might go to an extreme in this matter of costs, but I have no fear of any boiler manufacturer doing so. On the other hand, I feel that a large proportion do not go into this subject far enough, and for this reason sell their product at little or no profit and do great injury to themselves and the others engaged in the same line of industry.

Accounts Entering into Overhead Expense

I would suggest that the following items of expense be carried under separate accounts by all boiler manufacturers, in order to properly determine their overhead expense:

General	Water rents
Legal	Cartages
Advertising	Stable account (if you own your teaming outfit)
Traveling	Machinery repairs
Drafting room	Building repairs
Taxes	Tool steel
Fire insurance	Salaries of officers
Liability insurance	Salaries of office force
Heat, light and power	Non-productive labor
Interest	
Discount	

No doubt all of the above titles denote exactly what items ought to be charged under them, with possibly the exception of the last one. Under non-productive labor should be charged the salaries of superintendent and foreman, also wages of engineer, fireman, night watchman, teamsters, traveling crane operators, and the general repair man, as no plant is without at least one such man.

The 20 items enumerated above are by many considered as their total overhead expense, but my opinion is that they are not correct. To the total of these items should be added an amount equal to 6 per cent. on the actual capital invested (not the authorized capital stock, as that may be more or less than the investment). This amount should be added for the reason that one would have to guarantee a net 6 per cent. to the owners of the plant if the company operating it was not the owner. We should then add for depreciation on buildings and equipment. I would suggest that 25 years be estimated as the life of buildings, which would mean a 4 per cent. depreciation on their first cost. I would also assume that the life of machinery and equipment be estimated at not more than 15 years, and this would mean about 7 per cent. depreciation on their first cost. These items, added to the total of the 20 given above, would then represent the total overhead expense.

Perhaps some of you have noticed that I have not included the items of freight and commission. I do not feel that they ought to be included, because, as a rule, all plates, tubes, etc., are purchased f.o.b. our track, and the freight on them is added to the mill invoice, so that this takes care of all inbound freight. It is a simple matter to add to the estimate sheet the amount of freight from our plant to destination, so that this covers all outbound freight. In the same way should the commission be added, if there is to be any.

Percentage of Overhead Expense to Business Done

After finding our total overhead expense, the next step is to know what relation in percentage it bears to our business, so as to arrive at a factor for estimating on work. The question is, Should this factor be determined by comparison with total sales or by comparison with total pay-roll of shop force?

A journal that comes frequently to all boiler manufacturers had an article on this subject recently which stated that this factor should be gotten by comparison with total sales. To this I would take exception in so far as boiler manufacturing goes, as I believe the proper method is to make comparison of overhead with shop pay-roll. No doubt a great many boiler manufacturers are using the former method and are continually cheating themselves, as I shall try to illustrate.

Most boiler manufacturers build a general line of boilers and other steel plate work. Now, take as an example the estimate for a small fire-box boiler, made in accordance with United States marine laws, for a small craft like a river tug. I have taken off the cost record of such a boiler, and find the actual cost of material approximately $500 and the actual cost of labor was approximately $600, thus getting a total of $1100 for these two items. If one should add to this total an amount equal to that determined by figuring overhead against sales, we will assume that he arrived at 25 per cent. as his factor, and in this case it would be equal to $275, so that the total cost would then be $1375; and assuming that he adds 20 per cent. (which would only net about 16 per cent. on the sale) he would then have $1650 for a selling price.

Now, by using the other method of getting an overhead factor, he will find that his overhead total is at least equal to his shop pay-roll, or 100 per cent. To the $1100 for material and labor, he will add $600, or the amount equal to his actual pay-roll on this boiler, and he then gets a cost of $1700, and to this adds the same 20 per cent., getting $2040 for a selling price.

You will see that by the first method he has sold the boiler at $50 less than the actual cost, although his record makes him believe that he has had a profit of $275. Furthermore, you will note that it took $600 to produce a sale of $2000, and the same amount of labor applied to simpler work would have produced, roughly, $5000 in sales; as the margin is figured on the cost, the profit made on the tug boiler is only about one-third of what it would have been on the other class of work. It must therefore appear that a larger margin of profit should be had from the difficult jobs. However, I feel that a net 16 per cent., as given above, is small enough on even the simplest work, for the reason that, after considering the amount of capital invested, the small volume of business that a boiler shop can do as compared with the total investment, the years of experience and knowledge necessary to successfully operate a plant of this kind, it is today the most underpaid industry connected with the iron and steel business.

Allowances to Boiler Plant Owners

In some of our boiler manufacturing establishments where the ownership rests wholly with one or two men there still remains an old custom of granting to the owner or partners a nominal drawing account, so that when the books are closed at the end of the fiscal year they show a good profit. This, in my opinion, is wrong, as these men who give their entire time to the business ought to charge against the business salaries commensurate with their services, or what they would work at for some one else. Unless they do this they are fooling themselves in regard to the actual returns from their investment.

It takes as much study and labor to be a successful boiler manufacturer as it does to be a good lawyer or a good doctor, and lawyers and doctors today refuse to sell their services for less than $50 per day upward, and why should the men in this industry, who have equal ability in their line, sell their brains and time for little or nothing? I would here state that I am strongly in favor of economical management, but would also give to

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those who carry great responsibility a fair remuneration for their services.

The great trouble, in my opinion, is that we do not charge enough into our overhead. Some leave off the interest on their investment; others enter drawings as an asset instead of charging them as an expense; others enter patterns and dies in their assets at full cost price; others will trade off old tools, as, for instance, an air hammer or drill, and credit to their assets the amount paid in trade. This is all wrong, in my opinion.

I would also suggest that there should be a general rate attached for the use of such tools as hydraulic riveters, hydraulic flanging machines and presses, large bending rolls, etc. Today in Cleveland it costs 90 cents per hour for plumbers on repair work, 85 cents per hour for high-grade carpenters on repairs, and 60 cents per hour for a machinist in any auto repair shop, and they have no power to furnish, and only such tools as can be carried in a satchel, and yet there are very few, if any, of us that can say we average 60 cents per hour for all our help.

I take it for granted that we are all in business to make money, and we must therefore co-operate to our mutual benefit, and if we will carefully look into our costs and then try and get a fair margin for what we do, we will help to get the boiler business back where it belongs, as I feel that it has never recovered from the business depression of 1907 and 1908. The costs of plates, tubes, labor, etc., have been going higher steadily, and the price of boilers has advanced slightly, if at all. I feel safe in stating that there is not a boiler manufacturer present who feels he has had equitable returns on his labors during the past few years.

Isaac G. Johnson & Co. Sixty Years Old

The firm of Isaac G. Johnson & Co., Spuyten Duyvil, New York City, makers of steel, gray-iron and malleable iron castings, is this year celebrating its sixtieth anniversary, its plant having begun operations in 1853. During the Civil War many Government orders for war material were filled at the plant. Later the firm produced a soft-nosed steel projectile which was used by the Government. In recent years Government work has been more along the lines of intricate castings, which has long been the firm's specialty —castings which other firms either could not or would not make. Among other important work, castings are made for a large number of high-priced automobile companies, substituted for more expensive forgings. Recently steel wheels for heavy service automobile trucks have been produced, stronger and lighter than those made from wood.

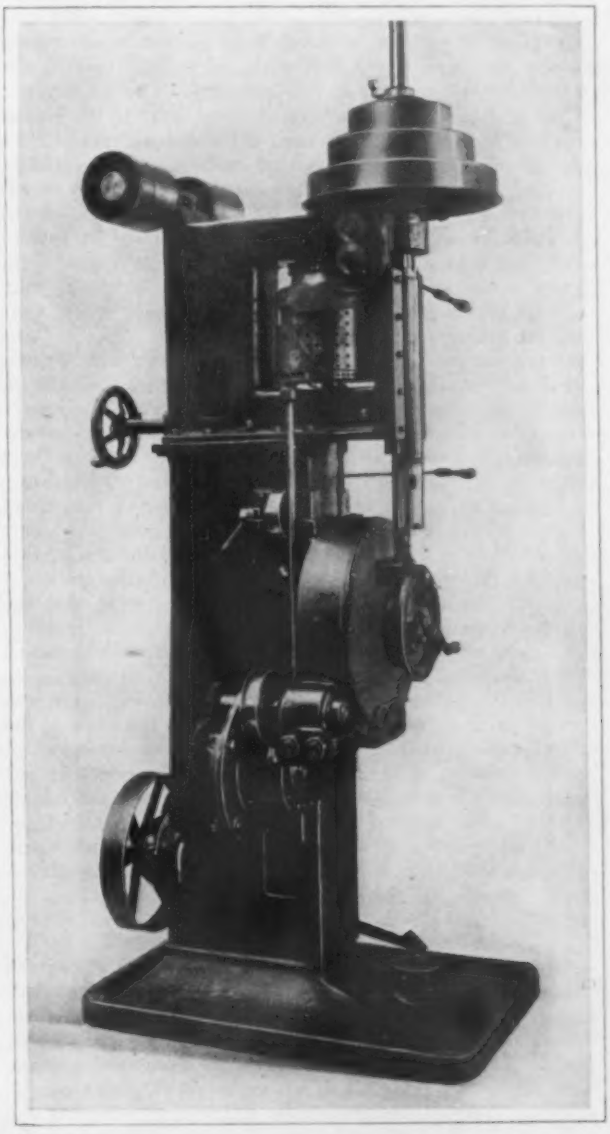
An unusual experiment having promise is the manufacture of gas and gasoline engine pistons from steel. Gas and gasoline engine pistons have heretofore been made from cast iron exclusively. The Mercedes Company had a racing car rebuilt in this country and Isaac G. Johnson & Co. successfully replaced the cast-iron pistons with one made from a special grade of cast steel. About three pounds were saved per piston through the substitution of steel for iron. The value of this improvement was demonstrated by the Mercer Automobile Company in this year's racing contests. Considering the number of revolutions an engine will make a day the reduction in weight of the piston is seen to be not an unimportant matter.

Rumors have obtained currency that the Harlem River Ship Canal would be straightened and the Johnson firm be forced to move its plant, as it is situated on a bend in the canal. This would cause considerable trouble, as the works are between the canal and a steep hill, and would have to be entirely removed. However, nothing definite has been decided in regard to the ship canal plans, and nothing can be done without the co-operation of the United States War Department, whose action has not been indicated.

A novel shipper's tag is being put on the market by the Metalock Mfg. Company, Inc., 25 Pine street, New York. It is the usual tag, but with a special attachment of a strip of metal to replace the string. Two twists of the pliable and strong metal lock the tag, preventing the loss and confusion often resulting from broken strings.

A Rapid Automatic Drilling Machine

An interesting development of the drilling machine has been made by Baker Brothers, Toledo, Ohio. The accompanying reproduction of a photograph shows the machine arranged to drill a flange with 24 radial holes. The machine is designed particularly for drilling radially, so



Machine Rigged for Automatically Drilling Radial Holes in a Flange

that a given piece may be readily rotated and the holes accurately spaced without the use of a jig, or provision may be made to secure a number of like articles or individual pieces held in a series of chucks radially arranged to take advantage of the automatic feature of the machine, where each piece, for example, requires drilling. The number of divisions or the spacing of drilled holes is obtained by means of change gears.

The 24 holes, 7/16 in. in diameter and 7/16 in. deep, were drilled in the flange in 55 seconds. Flanges of 3 in. to 24 in. in diameter can be handled on the style of machine shown. To facilitate its rapid operation, the machine is equipped with radial ball bearings.

The Interstate Commerce Commission has further suspended from September 12, 1913, until March 12, 1914, pending investigation, the operation of certain schedules filed. It was proposed by the suspended schedules to advance from 1½c. per 100 lb. to 2½c. per 100 lb. charges applicable to shipments of structural iron and steel stopped in transit for fabrication at points throughout Central Freight Association territory, except fabricating points located in Illinois. The commission also suspended until January 5, 1914, proposed increases in freight rates on scrap iron in carloads from New Orleans and Iberia, to Houston and other points in Texas, from $2.50 to $2.66 per ton.

Removing Carbon from Gas Engines*

Experiences with Denatured Alcohol for Cleaning the Engine Interior

——BY JOSEPH A. ANGLADA, M.E.——

About a year ago I tried the experiment of running a 10-hp. stationary engine on denatured alcohol. This engine had been running for about a year on gasoline and had shown marked evidence of faulty operation when fully loaded, although when first installed it had carried the same load without apparent difficulty. The experiment of using denatured alcohol consisted of starting the engine on gasoline and running it until it became warm when the gasoline was turned off and the carburetor connected to the source of denatured alcohol supply. As was to be expected, it was necessary to change the adjustment of the carburetor nozzle to permit a greater quantity of fuel to enter the engine. When this was done the engine continued to operate satisfactorily and carry without difficulty the load which caused the engine to misbehave when operated on gasoline.

This fact is merely mentioned as an incident because the interesting part of the experiment was that the exhaust, which was open to atmosphere, was clear when the engine was operated on gasoline, but became black with smoke immediately upon the change of fuel and after a short period of running on denatured alcohol the smoke disappeared and there was instead a large number of very small bright red sparks, namely, incandescent particles of carbon, which were loosened from the walls of the combustion space by the alcohol. This led to further investigation.

It was found on removing the cylinder head that the top of the piston, the valves and the walls of the combustion space were covered with a layer of carbon which varied in thickness from 1/16 to ⅛ in. On attempting to remove the carbon deposit with a pointed piece of wood, it was found to be sufficiently hard to turn the edge of the tool. When a steel scraper was used the deposit came off in the form of dust and small flakes. To continue the experiment the cylinder head was replaced and the engine operated under load with denatured alcohol as a fuel for 5 days of 8 hr. each, when the cylinder head was again removed. Examination showed that very nearly all of the carbon deposit had disappeared.

The Necessity for Removing Deposits

The presence of carbon deposits on the surfaces of the combustion space of any type of engine is to be avoided, because the radiation of heat from these surfaces is retarded, due to the relatively low conductivity of the deposits. Their presence may cause spontaneous ignition, which is a common source of rapid depreciation of the working parts of an engine, in addition to affecting the economical and quiet operation of the engine. Where the deposits are present in sufficient quantity, depending upon the design of the engine and the service in which it is employed, its operation may be entirely prevented, due to spontaneous ignition.

The phenomenon of spontaneous ignition (sometimes called pre-ignition, or self-ignition) is explained as follows: When the engine is in operation the temperature of the gases in the combustion space during the period of combustion is sufficiently high to raise the temperature of the deposit to a red heat. The result is that the deposit retains the heat imparted to it in the power stroke, and serves to ignite the new charge of inflammable gas on the following compression stroke. The result then is that the ignition of the gas and consequent high explosive pressure occurs too early on the compression stroke, the effect being that the force of the explosion tends suddenly to stop the engine and reverse its direction of rotation. The inertia of the fly wheel is generally sufficient to prevent this reversal, with the result that all the power transmitting parts of the engine are subject to undue stresses. The continuance of severe pre-ignition will in a short time cause the bearings of the connecting rod to fail. In many cases, however, the connecting rod or crank shaft is broken by the abnormal strain put upon it before the bearings fail.

In high compression engines it is possible for pre-ignition to occur, due to an increase of compression resulting from a decrease of compression volume because of a thick deposit of carbon which may or may not be at a sufficiently high temperature to ignite the charge. Carbon deposits are frequently the source of loss of compression because the hard flaky nature of these deposits will prevent proper closure of the valves if a small part of the deposit is loosened and becomes lodged on the valve seat. Carbon deposits are the cause of greater wear of the working parts of an engine than appears at first thought. It is but necessary to filter the oil drawn from the crank case of an engine, which has been in operation and analyzed and closely examine the substance extracted from the oil by the filter paper. It will be found that this substance is principally granular carbon which has worked past the piston rings and collected in the oil. If the engine is lubricated by splash feed or if the oil is used repeatedly without being thoroughly filtered, the carbon is carried to all of the working parts with the oil.

Nature of Experiments

At the suggestion of H. R. Brate, secretary of the association, the writer recently made a trip to Lakemont, N. Y., with the object of determining the effect of the use of denatured alcohol in two farm engines then available. Both of these were single horizontal cylinder engines, one made by the International Harvester Company and the other made by the Jacobson Machine Mfg. Company. Both of these engines were operated under a load applied by pressing a wooden lever against the fly wheel until the temperature of the jackets warmed to about 15[illegible] deg. F. The engines were then stopped with the piston at the head end of the compression stroke. Both valves were closed. The compression space of each cylinder was then filled with Pyro denatured alcohol, which in the case of the International Harvester engine was left to soak for 6 hr., and in the case of the Jacobson engine, about 3½ hr.

It was found that the exhaust valve of the International Harvester engine did not seat properly, because, when the alcohol was first put in the engine, it leaked past the exhaust valve. This leak, however, soon stopped, probably due to the alcohol's washing away whatever foreign matter was lodged between the valve and its seat. At the end of these periods, both engines were cranked by hand for a few revolutions, and then started in the usual way on gasoline. The exhaust in both instances, when the engine was started, contained a large quantity of black smoke and upon opening the compression relief cock of each engine a bombardment of small incandescent particles of carbon was seen and felt on each firing stroke, showing that the alcohol had loosened the carbon deposits in these engines.

In each case some of the alcohol leaked past the pistons into the crank case, showing that the piston rings were not liquid tight. In this connection it is advisable to note that almost invariably lubricating oil will collect in the piston ring grooves, where it becomes partially solidified in the form of a gummy material of sufficient strength to prevent the proper operation of the piston rings. The result is that the lubricating oil, which is fed to the cylinder, is called upon, in a very large measure, to assist the piston rings in making a gas-tight joint with the cylinder wall. When denatured alcohol is introduced in the cylinder in sufficient quantity, it will dissolve the gummy deposit and permit the piston rings to slide freely in the grooves and thus fit themselves more perfectly to the cylinder walls. That this occurs has been proved by tests of a number of automobile motors, which, after treatment with denatured alcohol, have shown an increase in power as well as in flexibility.

Conclusions

From a very complete series of experiments conducted with automobile motors which had been in service for different lengthy periods of time in addition to experiments conducted with a few marine and stationary motors, I have arrived at the following conclusions:

1. Denatured alcohol is an efficient decarbonizer for all types of gasoline engines.

2. It does not injuriously affect the surfaces of the metals with which it comes in contact.

3. Heat is not necessary when using denatured alcohol as a decarbonizer.

4. Heat accelerates the action of denatured alcohol when used as a decarbonizer.

*From a paper read before the National Gas Engine Association, Kansas City, Mo.

5. Denatured alcohol, when introduced in the combustion space of an automobile cylinder which is at the working temperature of the engine, will loosen the carbon deposit so as to permit the deposit to become separated from the walls of the combustion space and pass out of the cylinder with the exhaust gases when the engine is run.

6. The best results from the use of denatured alcohol as a carbon remover are obtained when the combustion space of a hot engine is entirely filled with liquid denatured alcohol and permitted to soak for a period not less than 6 hr.

7. Denatured alcohol will act as a carbon remover when the engine is cold, provided the liquid denatured alcohol is in contact with the carbon-covered surfaces. The action of denatured alcohol under these conditions is about half as rapid as when the engine is hot.

8. The action of denatured alcohol as a carbon remover when introduced in small quantities into the combustion space of a cold automobile engine is positive but slow.

9. Where the fit between the piston rings and cylinder walls is imperfect, denatured alcohol will leak past the pistons into the crank case and cause the oil in the crank case to become unfit for use for lubricating the engine. However, when a sufficient amount of denatured alcohol has been added to this oil and circulated through the lubricating system of the motor for a very short time, in order to obviate the possibility of damaging the wearing surfaces of the engine, denatured alcohol acts as a cleansing agent, as evidenced by the unusual amount of foreign matter withdrawn with the denatured-alcohol-treated oil and the subsequent improved action of the engine.

10. Due to the cleansing action of denatured alcohol, as noted in the preceding conclusions, an engine which has been in service for an extensive period will show a marked increase in operating efficiency when thoroughly treated with denatured alcohol.

11. It is advisable to introduce, in the manner noted in the experiments, from 2 to 4 oz. of denatured alcohol (depending upon the size of the cylinders) into each cylinder of an engine, at intervals of about three days, in order to keep the cylinders freed from carbon deposits.

Book Review

Factory Lighting. By Clarence E. Clewell. Pages vi+161, 6½x9¾ in. Cloth. Published by McGraw-Hill Book Company, New York. Price, $2.

The attention being paid to the subject of the safety of workmen lends added interest to a book dealing with the proper illumination of factories. The object of the book is to state in a simple manner the best way to obtain good lighting. The basis for the discussion is not a set of regulations but the experiences obtained from actual installations. The arrangement of the discussion is somewhat unusual in that practical results are given precedence over generalized statements in the treatment of each subject. The principal chapters cover office, drafting room, factory, power house, iron and steel mill, and machine tool lighting, the last two being especially interesting.

The electric lamp rather than gas is the type discussed because of its more general use, though the effects of each are similar in principle. More than usual authority is given to the treatise because the author has been engaged in designing and installing lighting systems of all kinds for a number of years in the works of the Westinghouse Electric & Mfg. Company, and has been a frequent contributor to various trade papers of articles on the subject, portions of which are incorporated in the book.

Leaflets on the subject of welfare are distributed in the payroll envelopes as one of the means of maintaining active interest in safety measures among the employees of the Republic Iron & Steel Company. In a brief article in the last monthly bulletin of the American Iron & Steel Institute, this practice is mentioned by John A. Topping, chairman of the company, who says that the leaflets contain suggestions and warnings against reckless practice, and they urge co-operation on the part of the employee with the foreman.

Customs Decisions

Machine Tool Decision

The Board of United States General Appraisers has decided that machines for use in working on metal bars and on glass are not to be regarded within the meaning of the tariff act of 1909, as machine tools. Duty was exacted by the customs authorities at Pittsburgh at the rate of 45 per cent. under the provision in the law for "manufactures of metal, not specially provided for." The Heppenstall Forge & Knife Company, and the H. C. Fry Glass Company, the importers, asked for a 30 per cent. duty under paragraph 197, as machine tools.

Nut Blanks

Adverse action followed an appeal to the board by the Detroit Screw Works, regarding the classification of nut blanks having holes punched through them, but without the threads cut. Duty was taken at 45 per cent. as "manufactures of metal, not specially provided for." Lower rates were claimed by similitude as iron or steel nuts under paragraphs 162 and 481. In overruling the protest, the board held that, since the goods are metal articles, it is not apparent how recourse can be had to paragraph 481, in order to make them dutiable under paragraph 162. According to the board, such metal articles as are not otherwise provided for find classification under the basket clause of the metal schedule of the tariff act and are therefore sufficiently enumerated to take them out of the similitude clause.

Textile Machine Repairs

Leigh & Butler were sustained in a contention relating to various cast-iron repair or replacement parts for textile machinery. The importations were taxed at 45 per cent. under paragraph 199, and claimed to be dutiable properly as iron castings advanced in condition, at 1c. per lb. under paragraph 147.

Oil Deodorizers

The board has taken adverse action on protests by the T. B. Walker Mfg. Company regarding the classification of high-pressure converters supplied with complete armatures. Duty was imposed by the collector of customs at Galveston at the rate of 45 per cent., under paragraph 199, as manufactures in chief value of metal. The converters were claimed dutiable at 30 per cent., under paragraph 151, as cylindrical metal vessels or containers. The board held that it was clear under the law that the converters or process tanks devised for the deodorizing of oils are not within the scope of the provision in paragraph 151 for tanks or vessels.

Bars and Strips of Steel

The American Express Company and other importers were sustained in claims relating to the rates of duty on steel bars and steel strips. The bars were assessed with an additional duty of 4/10 of 1c. per lb., under paragraph 137, as polished, while the strips were returned with an additional duty of 1c. per lb. under the same paragraph as cold-rolled. The importers denied that the goods had been polished or cold-rolled within the meaning of the law. The board held that the testimony of the importers was conclusive and reversed the assessments.

The General Electric Company, Schenectady, N. Y., has recently received orders from steel and iron companies as follows: American Sheet & Tin Plate Company, Pittsburgh, Pa., for its electrical equipment at Gary, Ind., two 1600-hp. mill-type motors with sectional control equipments and panels; Otis Steel Company, Cleveland, Ohio, two 4500-kw. Curtis turbo-generator units, with a 100-kw. turbo-exciter and a 50-kw. motor-generator exciter set; two 1000-kw two-unit two-bearing motor-generator sets, three 400-kva. transformers, one 1600-hp., two 1200-hp. and one 200-hp. motors, and switchboard panels and accessories; Brier Hill Steel Company, Youngstown, Ohio, four 75-hp. and one 875-hp. mill-type motors; National Tube Company, Pittsburgh, Pa., for its Pennsylvania works, two 150-hp. induction motors; Illinois Iron & Bolt Company, Carpentersville, Ill., 15 motors, ranging from 3 to 40 hp., with oil switches and accessories.

The Problem of Burning Pulverized Fuel

Promising Results with Powdered Coal in a Vertical Steam Boiler

—BY STERLING H. BUNNELL—

The efficient use of fuel in pulverized form has been the subject of much study by engineers and others. Large amounts of money have been spent, and much valuable time lost, in developing systems of firing steam boilers with coal in powdered form. It will be interesting to look into the principles involved in the development of a successful method of burning finely powdered fuel by a continuous and uniform process.

What Makes for Rapid, Thorough Combustion

All combustible materials are naturally in a state of unstable equilibrium, chemically; they need only a little push to start a combining process. If a tiny fragment of a haystack is heated to the point where its carbon and hydrogen begin to unite with the oxygen of the atmosphere, the neighboring mass of hay promptly joins in and continues the chemical process until only incombustible ash remains. A similar initial push will start combination with oxygen or combustion, in a wooden house or a pile of coal. The combination is more or less gradual, because only the surface of the fuel can get access to oxygen and combine or burn. The interior of a piece of fuel cannot burn until the exterior is out of the way. Therefore, to cause rapid combustion of fuel it should be broken into small pieces, and these should be freely supplied with oxygen. This is usually done by spreading the broken fuel over a grate, and arranging for a draft of air to bring the necessary oxygen to every particle of fuel.

This common method depends for best success on constant attention. The fuel may soften and run together, shutting off the supply of air. It may burn away in spots, leaving spaces of grate uncovered, through which the air can rush without coming in contact with combustible fuel. It may burn and leave a residue of large masses of unburnable clinker occupying space on the grate, but useless to the furnace. Or, it may separate in the heat and discharge quantities of unburned particles of carbon-smoke. The only way to keep up a brisk and reasonably uniform fire on a grate is to provide a poker and slice bar, and a man to use them to make good each defect in the fire as it occurs.

All the irregularities in the ordinary coal fire are caused by differences in the size, shape and quality of the lumps of coal. Small lumps burn faster than large ones, because they have proportionately less material inside and so are prevented from taking fire until the outside is burned away. For ideal conditions, the coal should be crushed to dust, and each particle of the dust floated in enough air to supply oxygen for burning it. Combustion, following ignition, would then be quick and complete, leaving only dust particles of unburnable ash. A mixture of coal dust and air in proper portions, blown through the nozzle of a burner, gives a steady, very hot flame like an oil or gas flame, economical of fuel, effective and easily controlled by a simple valve in the supply pipe. But the greatest advantage of this method of firing is that all parts of the fuel are thoroughly exposed to the air. The poorest mixtures of coal and incombustible minerals, fired in this way, give their full heat value. The coal particles burn away completely, leaving only inert slag or clinker, instead of the mixture of unburned coal with a small quantity of unburnable silicates that form the usual ash.

Difficulties in Using Pulverized Coal

In the practical application of pulverized coal firing, a good many difficulties were met. There was no existing machinery suitable for pulverizing the coal and mixing it evenly with air to form the necessary blast. Ignition of the blast takes place a little way beyond the nozzle from which it issues, and slight variations in the proportions of air and coal caused a tendency for the flame to blow itself out. When the apparatus was working well, the heat was so intense as to melt down the best firebrick furnace lining, and even destroy the steel nozzle of the blast pipe. Finally, the incombustible portions of the fuel were melted in the intense heat and deposited as a hard clinker or slag upon the furnace walls outside of the range of the greatest heat, and could not be removed without injuring the brick or metal to which the slag adhered.

Various forms of grinding and crushing mills have been tried for pulverizing the fuel in advance of mixing it into the air blast. This system has been found unsuitable for use in boiler firing, because of the tendency of the powdered coal to pack together into lumps when lying in the storage hoppers, and the expense of operating the pulverizers. The most promising method is to pulverize the coal and mix with it air in a single operation, by feeding the coal to the blades of a strongly built blower fan. The fan or beater wheel is strongly constructed of steel forgings and plate, and the beater blades are made of manganese steel. The fan casing is lined with segments of the same material. Blades and segments must of course be removable when worn out so that a new set can be substituted. This form of pulverizer gives the coal dust no chance to pack into lumps, and supplies the coal dust and necessary air blast at the same time and by a single apparatus.

The blast when ignited burns uniformly with intense heat, and the rate of combustion can be varied by increasing or decreasing the speed of the pulverizer and the rate at which it is supplied with coal.

The other difficulties can be overcome only by the development of suitable furnaces, and boilers to utilize the heat. As the waste flue gases carry off part of the heat developed from the fuel, their quantity should be kept at the minimum, which means that the supply of air must be limited, and the temperature of combustion therefore high. Water-cooled firebrick have been tried as a furnace lining with some success; but if the furnace lining is cooled too much, the regenerative effect will fall off so that the flame may blow out and fail to re-ignite. Slag and clinker on the furnace walls, as well as dust in the flues, have been extremely troublesome in many attempts to apply the system to boiler firing and other purposes.

Promising Results with a Vertical Boiler and Furnace

Promising results are said to have been secured by a new type of vertical boiler and furnace, recently brought out in England, and already installed in several plants in Great Britain, South Africa and Canada. A feature of this system is the manner in which the flaming blast is made to return upon itself, an outer cylindrical stream of incandescent gases surrounding the nozzle-stream. In this way the nozzle flame is always in contact with a layer of highly heated gas, and cannot blow itself out. The furnace walls are cylindrical, and formed of firebrick shapes backed by water-tubes to prevent the destruction of the brick by the heat. Against these vertical walls the clinker and slag is condensed and flows downward in liquid form, dropping into a pit below, from which it is easily removed at any time. The boiler was invented and patented by Claude Bettington, of London, for the special purpose of utilizing refuse and low-grade coals.

The Bettington boiler consists of an annular header surrounding the blast nozzle, and a cylindrical header about 20 ft. above, with a number of vertical tubes expanded at top and bottom into the respective headers. The tubes thus form a cylindrical cage, within which the flaming blast turns back on itself, follows down along the fan of the firebrick shapes which protect the inner tubes from injury by the intense heat, and turns out between the tubes through a space left below the firebrick lining and above the lower header. The heated gas passes upward along the outside of the outer tubes and around the upper header, and thence to the stack. Circulation and evaporation are extremely rapid in the vertical tubes, and the long double pass of the gases of combustion down and up along the whole length of the tube surface, insures effective transmission of heat and high economy. In fact, efficiencies of more than 80 per cent. have been obtained with very low grade coal.

A thoroughly reliable and satisfactory boiler equipment capable of utilizing the slack, dust and slaty coal wastes of the mining districts, and the low-grade coals and lignites found in quantity in portions of the country remote from supplies of good steam coal, will be of immense benefit to manufacturers and for power distributing plants.

Higher Union Wages and Shorter Hours

Interesting figures are presented in a report just completed by the Bureau of Labor Statistics in regard to union scales of wages and hours of labor throughout the United States for the years 1907 to 1912, inclusive. It is emphasized by the data contained in the report that, while wages have been increased, hours of labor have been decreased the last six years in 40 trades in 39 of the most important industrial cities.

The report was prepared by Fred C. Croxton, who also directed the field work which was under the immediate charge of J. J. Sullivan. In every case the data were furnished by officials of labor unions, and the compilers of the information used wage scales, written agreements and trades union records wherever available.

A carefully worked out table, given below, brings out strikingly the decrease in hours of labor and the increase in wages, an average being struck for each of the trades covered in all the cities. The figures in the table are based on a comparison of the rates of wages on May 15 of each year, and the hours prevailing during the whole year. The occupations covered are bakery, building, marble and stone, metal, book and job printing, and newspaper printing trades.

Occupations	Per cent. decrease in hours per week	Per cent. increase in wages per hour
Bricklayers	2.1	5.5
Building laborers	.25	6.5
Carpenters	1.2	11.1
Cement workers (finishers)	1.8	5.7
Cement workers (helpers)	.7	16.2
Cement workers (laborers)	1.4	17.5
Gas fitters	.1	9.1
Hod carriers	3.0	5.9
Inside wire men	1.3	15.4
Inside wire men (helpers)	2.6	11.7
Marble setters	1.5	5.1
Painters	1.9	12.6
Plasterers	.9	5.0
Plasterers (laborers)	1.0	8.2
Plumbers	1.2	10.7
Sheet metal workers	1.7	12.9
Steam fitters	2.0	13.1
Steam fitters (helpers)	1.7	15.1
Stone masons	1.8	5.8
Structural ironworkers	2.7	11.1
Granite cutters	2.0	5.3
Stone cutters	.5	1.6
Blacksmiths	2.1	10.3
Blacksmiths (helpers)	2.2	16.4
Boilermakers	1.6	16.5
Boilermakers (helpers)	2.4	16.9
Coremakers	2.3	13.8
Machinists	2.2	9.6
Molders, iron	1.3	7.4
Patternmakers, wood	2.8	8.3
Bookbinders	11.1	16.8
Compositors, book and job; no change	..	16.0
Batterymen and builders, electric	4.2	17.5
Finishers, electric	5.3	12.8
Molders, electric	5.1	12.7
Linotype operators, electric	0.2	7.0
Press feeders, electric	9.8	22.6
Pressmen, cylinder presses, electric	6.0	21.0
Pressmen, platen presses, electric	5.1	14.8
Compositors, day work	0.5	10.4
Compositors, night work	0.1	6.1
Linotype operators, day work	0.4	8.6
Linotype operators, night work	0.3	5.9
Pressmen, web presses, day work	1.5	12.1
Pressmen, web presses, night work	1.5	9.1
Stereotypers, day work	1.7	9.1
Stereotypers, night work	1.6	9.0

The West Milwaukee shops of the Chicago, Milwaukee & St. Paul Railroad are operating at full capacity on an executive order for 65 Mikado and consolidation type locomotives and 3750 freight cars. The order requires 37 per cent of the company's labor and facilities at West Milwaukee. The remainder of the force is devoting its entire time to locomotive and car repairs. The full-time operation began some weeks ago, and at present the shops, which are the largest in the company's system, have reached the high-water mark of production established in 1907. A. E. Manchester is in general charge.

The manufacturing property of Milliken Brothers, Inc., is to be offered at public sale October 10 by the referee in bankruptcy. It is located on Staten Island, N. Y., and consists of an open-hearth steel plant, mills for rolling structural shapes and a structural fabricating department. The fabricating department has been continued in steady operation, but the steel plant and structural mills have not been in use since 1907. It is expected that the bondholders will bid in the property and reorganize the company.

The Pittsburgh Steel Company's Report

The Pittsburgh Steel Company has sent to its stockholders the following statement of earnings for the fiscal year ended June 30, 1913:

Sales		$11,654,888.02
Add: Inventory of finished goods at end of period		1,143,931.72
		$12,798,819.74
Deduct: Inventory of finished goods at beginning of period		1,277,977.75
		$11,520,841.99
Materials used and cost of operations (including repairs and maintenance of plants)		9,193,759.87
		$2,327,082.12
Deduct: Selling and general expenses		1,186,339.12
		$1,140,743.00
Add: Interest and miscellaneous income		84,921.61
		$1,225,664.61
Deduct: Interest charges		31,995.12
Net earnings		$1,193,669.49

The balance sheet as of June 30, 1913, is as follows:

Assets

Capital:		
Real estate, buildings, plant and machinery	$17,451,764.37	
Stocks of subsidiary companies	415,500.00	
Patent rights (not valued)	.....	
		$17,867,264.37
Current:		
Cash	$974,828.41	
Notes receivable	496,433.65	
Accounts receivable (net)	2,084,841.48	
Finished product, raw materials and supplies on hand	2,223,072.64	5,779,176.18
Total		$23,646,440.55

Liabilities

Capital stock:		
Preferred	$10,500,000.00	
Common	7,000,000.00	17,500,000.00
Chicago real estate bond and mortgage	.....	30,000.00
Current:		
Time and demand loans	$941,000.00	
Accounts payable	1,524,910.36	2,465,910.36
Surplus		3,650,530.19
Total		$23,646,440.55

President Wallace H. Rowe makes the following accompanying statement:

"Our two new blast furnaces were put into successful operation in August, 1913. These large and modern blast furnaces represent the last word in furnace construction, and from the splendid start made it would seem that our expectations from the standpoint of construction, volume of output and cost of making iron, will be fully realized.

"To provide a supply of iron ore for these furnaces and to make the company absolutely independent, by owning its own raw material, your directors during the latter part of 1912 closed negotiations for a large iron ore property situated in the Cuyuna Range, Minnesota. Before and since taking over this property diamond drilling has been persistently carried on, with the result that millions of tons of high-grade ore have been proven up, and a constant supply of ore for our blast furnaces assured for a great many years.

"In the past our net profits have been affected by violent fluctuations in the price of raw material on account of our being obliged to buy pig iron in open market. This is now obviated, and our earnings should show a substantial increase, not only from a cheaper cost for iron, but also from the large gain in product from the open-hearth steel department, owing to our taking the molten metal direct from the blast furnace into the open-hearth steel furnaces.

"With the completion and putting into successful operation the last unit (blast furnaces) of a continuous process, we now find ourselves in position to produce a large tonnage of highly finished open-hearth steel products of a greatly diversified nature, with brands and trademarks thoroughly established, directly from nature's storehouse. All departments of plants are in a high state of physical efficiency. Our relations with our numerous employees are most cordial. Therefore, in summing up from all viewpoints, the future of your company seems bright to me."

The Southern Wheel Company, recently formed to take over a number of carwheel manufacturing companies in different parts of the country, and including the St. Louis Wheel Company, has taken quarters in the recently completed Railway Exchange Building, St. Louis.

ESTABLISHED 1855

THE IRON AGE

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Large Open-Hearth Outputs

The discussion at the Brussels meeting of the Iron and Steel Institute on the tilting open-hearth furnace would have had added interest if the figures had then been available which were published in these columns last week, showing the performance of the new tilting furnaces of the Lackawanna Steel Company at Buffalo. Mr. Talbot, in stating the case of the tilting furnace, said that from a single furnace of 150 to 200 tons capacity, with direct molten pig iron only, outputs of 1200 to 1500 tons per week of steel ingots are being obtained; with desiliconized metal from a preliminary refining furnace, 1800 to 2000 tons a week; while when blown metal is charged into the tilting furnace instead of pig iron, outputs have run up to 4000 tons a week. The performance at Buffalo that has attracted the attention of open-hearth steel men all over the country makes Mr. Talbot's claims for output with blown metal seem mild indeed, 20,000 tons a month per furnace having been done regularly, while the July total of one furnace was 22,000 tons.

In the light of these remarkable records, it would seem that rather hasty conclusions have been formed in Germany where, on the basis of a record of 1500 tons a week from 60-ton fixed furnaces at Gutehoffnungshütte, with molten pig-iron charges, the question is raised, wherein consists the advantage of the tilting furnace which in England produces 1200 to 1500 tons a week from molten pig-iron charges?

The same discussion at Brussels brought out the surprising statement from a prominent Belgian steel maker that the reason Americans had abandoned the Bessemer process for the open-hearth was that they had too much phosphorus in their ores and could not obtain a sufficiently good rail steel. The statement illustrates again the danger of sweeping generalizations. As has been frequently pointed out, rail steel is a diminishing percentage of the total output in this country, under the steady building up of other lines; last year it was only about 10 per cent. of the total. The statistics show that between 1906 and 1912 there was an increase in the production of Bessemer ingots entering into other rolled forms than rails from 7,500,000 tons to 8,885,000 tons. It may be said again, moreover, that the place of the open-hearth steel rail is by no means established, as against the combination product of the Bessemer converter and the electric furnace. So far as the supply of Lake Bessemer ores is concerned, it is ample for carrying out such a programme, as well as providing for the demands of the sheet and tin plate and in part the wire and tube industries, over many years.

The outstanding fact in recent steel works practice in this country to which no reference was made in the discussion at the Brussels meeting is willingness to make a heavy initial outlay to secure the low unit cost resulting from large outputs. It is the same policy that has put American blast furnace outputs so far in the lead. There has been some disposition, it is true, to question the claims of economies to be secured from duplexing, where new Bessemer plant has to be built. But outputs such as have been made at Buffalo go far toward settling the question. Where Bessemer plant is already in existence, and rail steel is a large part of the product, duplexing is the one answer to the present situation in the rail market.

Future Growth of the Automobile Industry

In referring in this column last week to the automobile consumption of steel in the United States it was stated that if the total for 1913 does not reach a million tons that figure is a possibility by another year. The tendency to use steel in the construction of motor vehicles, it was pointed out, is so marked that the automobile of the near future is likely to be almost entirely of iron and steel, with a consumption of one-half ton to two tons per vehicle. It will be of interest, in this connection, to refer to some considerations bearing on the growth of the industry.

The annual output of motor vehicles has been increasing so rapidly that in forecasting the future it is of more importance to consider possible limitations to the growth, yet to be developed, than to study as a guide for the future the rate of increase in manufacture which has obtained to date. The chief of these influences may be summarized as follows:

1. The supply of materials for construction.
2. The supply of materials for operation.
3. The desire of the public.
4. The purchasing power of the public.

As to materials required in construction there is no limit, seeing that the vehicle of the future is to be almost exclusively metal. Leather and cloth can be obtained in ample quantity. Tires we do not consider under this head, for they belong to the second head, that of operation.

As to materials for operation, it is to be observed that the supply of rubber is not proving as inadequate as was predicted a few years ago would be the case by this time. Furthermore, an increasing proportion of the vehicles are using solid rubber tires. A substitute for rubber in this use is much more likely to be found than a substitute for rubber in the pneumatic tire. With the rapid improvement of roads the pneumatic tire becomes less and less necessary for many vehicles, particularly as there is rapid growth in the use of vehicles, such as omnibuses, trucks and town pleasure cars, which are used to run only over fairly well-defined territory.

The supply of lubricants presents no problem. The supply of fuel has been held to furnish a serious one, but only in the sense that it is necessary for further work to be done, for there is every prospect that it will be adequately solved. The future use of motor vehicles cannot be regarded as depending upon engines requiring gasoline of the grade hitherto universally employed. In early years the engine was the most troublesome part of an automobile, and it is well recognized now that the automobile would have come sooner had the engine been available. Enough has already been accomplished to make it practically certain that as long as hydrocarbons can be furnished, engines can be constructed which will convert the hydrocarbons into power for motor vehicles.

As to the supply of hydrocarbons there is no question. Apart from their production from vegetation, which presents an interesting field, the petroleum output may be depended upon. At present motor vehicles consume only a very small proportion of the total hydrocarbon furnished by our petroleum production, but by modifications in distillation and modifications in engines, even though the latter may have to be radical, very nearly the total petroleum output could be used. Other forms of hydrocarbon consumption must yield to the motor vehicle if the latter requires the material, because they can use something else and the motor vehicle cannot. Oil for illumination has yielded very largely to the electric light. Railroads will increase their use of electricity more rapidly than their use of oil fuel, and ocean vessels will be prevented from largely adopting oil if the motor vehicle needs it. These points are mentioned merely to round out the argument, for the supply of petroleum promises to be ample for all very desirable uses, as a little consideration will show.

Comparing the United States production of petroleum in decennial years, 1862, 1872 and so on to 1912, there have been the following increases: 106 per cent., 383 per cent. 66 per cent., 76 per cent., 151 per cent. The increases have been rapid and instead of their showing signs of tapering off, the increase from 1902 to 1912 was twice as great as in the two preceding periods. The 1912 output was 222,538,604 barrels, or approximately ten billion gallons. At 27½ miles for every day in the year a vehicle will run 10,000 miles a year, doubtless a high average for all vehicles. At ten miles per gallon there would be required a thousand gallons of fuel per year per vehicle. To operate ten million vehicles, or one for every ten inhabitants, would therefore require ten billion gallons, the present production of crude oil. With the production rapidly increasing, with an increasing percentage of the output convertible into vehicle fuel, through changes in methods of manufacture of the fuel and changes in engine construction, there will obviously be furnished such a supply that the use of motor vehicles will not be restricted by lack of fuel.

The third possible restriction on growth in automobile manufacture mentioned above was the desire of the public. No limit is now apparent, either as to pleasure or as to commercial vehicles. As roads are improved the desire will grow, from reducing the cost of operation and increasing the pleasure in pleasure vehicles or the profit in commercial vehicles. The brick surface, though expensive, will probably be that of the future, involving the least expense to the civic body which must maintain it, and the least expense to the user, in fuel consumption and tire wear. We do not refer to the description of bricks mentioned in a recent consular report as being produced in England by casting blast furnace slag, and in the manufacture of which the last operation was for a workman with a hammer to knock off the projections. Such a brick would hardly be "good" for tires.

Finally, as to the purchasing power of the public: This is a constant surprise. In every direction the people buy more than those who take such a warm interest in them think they ought to be able to buy. Many men whose purchase of an automobile two or three years ago was thought by their friends likely to prove a disastrous extravagance are now calmly buying new and higher priced machines. Additional commercial vehicles are being bought. The makers of the cheaper machines cannot keep pace with the demand, while the American Locomotive Company, which made so high priced a machine that it appealed almost exclusively to those to whom money was no object, has abandoned the business as continuously unprofitable.

Thus there is every prospect that from nearly a million tons a year at present the automobile consumption of steel will greatly increase in the next few years. The tonnage is of great importance to the industry in

itself, but there are other considerations which make this class of trade particularly interesting. In the first place, the automobile has been blazing the way right along for the manufacture of better steel, which once developed is seized upon for other uses for which, perhaps, it would not originally have been developed. Again, in automobiles finished steel passes through one of its shortest lives, only a very few years, so that the demand will continue and not undergo such retrogressions as have occurred with rails. In rails the record production of 1887 was not passed until 1899, and the record of 1906 has not been touched since. The automobile demand promises a steady, not a temporary, increase.

Predatory Legislation

The London Globe has coined an expression, in referring to legislation in Great Britain, which also seems applicable to recent developments in this country. The Globe analyzes the tremendous strides which have been made in Great Britain in meeting the demands of the trade unions, and says that the government cannot continue to provide old age pensions, expensive insurance and the hundred-and-one other demands of the unions without some other class feeling the pinch. It points out that the people who pay for the lightening of the even well-to-do workingman's life belong to that great middle class which before the recent marked increase in the cost of living found the struggle for existence a hard and strenuous one, and it concludes that it is the duty of the dominant party to come to the assistance of a class which above all others "has suffered from the predatory and socializing legislation of the past few years."

We have had in this country much to say about predatory wealth, and under the leadership of forceful men those who have accumulated more than the average share of this world's goods have come to be regarded as fair targets for attack by legislation and otherwise. This disposition was especially marked under the Roosevelt administration and continued under the Taft régime, and, now that the political complexion of the National Government has been changed, it would appear that efforts are to be made to cast former achievements of this character in the shade. State legislatures are following in the wake of Congress and are doing their share in heckling those who are believed to be in the possession of more or less capital. All such legislation as provides for the burdensome taxation of railroads, full crews on railroad trains, excessive allowance in the way of workmen's compensation and further shortening hours of labor, may be regarded as predatory legislation. It would compel an ever-increasing amount to be taken from one class of citizens and applied to the presumed benefit of another class. This latter class, through the efforts of the unions, has in late years been greatly increasing its emoluments, until now it practically represents a privileged class. The report just published by the Bureau of Labor Statistics at Washington shows how unions in 40 trades and in 39 different cities have had their wages increased and their hours of labor shortened since 1907. Such changes as these are made at the expense of other citizens. They contribute measurably to the high cost of living. Possibly some day may see a reform in this respect, but for a time it will be necessary for those who do not belong to unions and who have fixed incomes to endeavor to check the tendency toward even more pronounced predatory legislation.

Correspondence

Puddled Iron Output of Schuylkill Valley

To the Editor: Referring to your editorial of September 11 on "The Greater Handicap of Wrought Iron," we wish to say that while we fully endorse your suggestion that an important distinction needs to be drawn between the genuine wrought iron puddled from pig iron and the so-called wrought iron made of miscellaneous scrap, we most emphatically object to having this classification made according to the district of its manufacture, as one could easily infer from your remarks that the higher grades of wrought iron are made only in Pittsburgh and the Valleys (of that vicinity), while the other districts made only the cheaper grades. The Reading Iron Company produces more genuine wrought iron puddled strictly from pig iron, without the admixture of any grade of old material (either selected or otherwise), than any other concern in this country. If we add to this the product of other well-known rolling mills in the Schuylkill Valley and vicinity, which also make wrought iron puddled from pig iron only, and considering that many of the puddle mills located in Pittsburgh and the valleys have been idle since July 1, we venture to say that the total production of genuine wrought iron puddled from pig iron made in the Schuylkill Valley and vicinity alone exceeds that of all the mills in Pittsburgh and the Valleys of that vicinity.

READING IRON COMPANY,
GEORGE SCHUHMANN, Vice-President and General Manager.
Reading, Pa., September 12, 1913.

Better Means of Rear Flagging for Trains

To the Editor:—The recent accident on the New Haven Railroad has excited universal horror and criticism. Some of the latter is just and some unjust, but none of it has been directed at the weakest point in the whole safety system of modern railroading—the rear flagman. For an earlier day, when trains were half or a third of their present weight and ran at slower speeds and longer intervals, the system of sending back a flagman was good enough and was perhaps the best that could be done in the state of the art then existing; but that it is now utterly insufficient to meet the conditions is proved not only by the persistence of the rear end collisions but may also be shown by a very simple analysis.

Brake Shoe Pressure Limited

The braking power of trains is limited, as is well known, to such a brake shoe pressure as will permit the wheels to continue to turn; since if the wheels once begin to skid on the rails the resistance to train movement is reduced about twenty per cent. Skidding therefore not only produces flat wheels, dangerous heating of treads, and injury to rails; but greatly diminishes the holding power of the rails and consequently increases the time and distance in which the train can be stopped. For these reasons braking must be and is held a safe margin below the skidding point.

It is a matter of common knowledge among those who have operated mining or temporary industrial railroads that a locomotive cannot be guaranteed to climb a grade of over 10 per cent. because slipping begins near that point. Under favorable conditions of rail and track grades as high as 15 per cent. may be ascended, but a curve in the track will induce slipping instantly; and if the condition of the rail is at all bad such grades are out of the question. I have even seen a car on straight track on a 4 per cent. grade when the rails were covered with sleet skid at a velocity of only two or three miles per hour, so that it was almost impossible to stop it.

The Time and Distance Required to Stop a Train

Irrespective of the braking power which may be provided, therefore, a coefficient of friction of 10 per cent. is

the highest that it is safe to depend on for stopping trains and in many cases this is beyond the actual resistance available. It is easy to show that with the coefficient of friction of 10 per cent. a train running 60 miles per hour would require a distance of 1200 ft. in which to stop on level track and 10 per cent. more for each 1 per cent. of down grade.

This is virtually a quarter of a mile. Therefore, to prevent rear end collisions a train running 60 miles per hour must have a quarter of a mile in which to stop after being flagged, without any margin of safety at all. Sixty miles an hour is not nearly so rare a speed as the public thinks. I have myself timed the mile posts from an ordinary express train which did not seem to be going very fast and found them sliding by in 55 seconds or less, for miles at a time.

Dependence on Rear Flagman No Longer Safe

On a down grade with a heavy train or when trying to make up lost time such speeds are not uncommon and would not be suspected by the ordinary passenger. Fifty-five seconds per mile is 65½ miles per hour and the stopping distance for this speed is 1450 ft. In ordinary weather conditions at night it is out of the question to expect a flagman to walk at the rate of more than 3 miles per hour when carrying a lantern, flare torpedoes, etc. At this speed it would take him 5 minutes to get back ¼ mile, if he started instantly when the train stopped.

If a train were following at 60 miles per hour within 5 miles it would be impossible for the flagman to prevent a collision. If the train were running at 30 miles only it would require only one-fourth the distance in which to stop, but even under these favorable conditions a collision would scarcely be avoided if the following train were within a mile.

All this on the assumption:

1. That the following train is running at only an ordinary operating speed.

2. That the flagman starts back instantly and keeps up a good average speed *to the full distance needed.*

3. That the track is nearly level and in good average condition for braking purposes.

4. That the engineer sees the signal and applies his brakes *instantly* and that they work perfectly.

As a matter of fact if the weather is bad in any way the consequences are likely to be:

1. The train will be running at an abnormal speed to make up time lost through bad weather conditions.

2. That the flagman cannot make as good speed in the first place and does not wish to do so in the second. (Jokes about the short distances to which flagmen go back are among the most common with trainmen.)

3. That the track is slippery with rain, fog, or sleet, or even with mashed leaves in the fall of the year.

4. That in fog or snow storm the engineer may not see the signal or realize what it is until he has passed it. In good weather and on straight track matters are helped by the engineer's ability to see the signal of the flagman at a distance of several hundred feet, but on curves or in bad weather this is not so.

The danger due to unavoidable delay, while the flagman is getting back is repeated when he has been called in; the time required for his return is almost as great and the danger of a rear end collision is only lessened by the torpedoes he may lay but often does not.

These elements of danger in trusting to rear flagging will gradually force the universal introduction of the absolute block system under which a derail is operated in conjunction with the danger signal so that if an engine runs by the signal it is automatically derailed and ditched. But that time is still a long way off and until it arrives we need a substitute for the flagman and his very human limitations and fallibility. Such a substitute under present conditions it is easy to provide and operate as follows:

Proposed Mechanical Substitute for Flagman

Provide at the rear of every train a light low four-wheel truck driven by a motor of 3 or 4 hp.; the latter connected with the electric system of the train by a flexible cable 1500 to 200 ft. long, this cable being carried on a reel mounted on the truck and geared to it in such a way that the cable is paid out and picked up as the truck runs backward or forward. On this truck would be mounted a powerful red light or preferably two of them; one an oil lamp, the other electric, and of course, flags for day service. The truck would carry immediately over the rail magnetized torpedoes, which, on the reversal of the current to recall the "flagman," would be deposited on the rail. The reel would be attached to cut-out switches so that the motor would slow down and stop before the end of the cable was reached. The current for operating the flagman would come from the electric system of a train having one; or from a storage battery of small size under the last car when the train carried no regular electric system. A switch at the end of the rear car would give control. When closed the "flagman" would run back the determined distance and stop there simultaneously turning on the electric danger signal. On the reversal of the current the light would go out and the flagman "come in" after having deposited torpedoes if desired.

Such a car could safely run at a speed of 15 to 25 miles per hour and would go back 2000 ft. in about one minute. The track would always be clear for it even in a snow storm, as the train would have cleared the rails. In case of a long delay in a very heavy snow storm if the "flagman" were unable to come in through the accumulated snow, the train would have to go back to pick it up; but this would be of such rare occurrence as not to be a serious drawback. Against the contingency that in very bad weather the engineer of a following train might not see the signals on the truck, a human flagman might also be sent on the truck, and he, on the resumption of his own train, could leave a flare as a dependable safeguard.

When not in service the truck would run behind and partly under the last cars. It could be so arranged as to be lifted just clear of the track and carried by the last car if desired, but this would probably not be necessary.

The advantages of such a mechanical flagman are as follows:

1. It would surely go back to a safe distance and stay there irrespective of the weather.

2. It would go back in so short a time as to eliminate the danger from delay in signaling.

3. It could and would carry more numerous and more powerful safety signals than are possible for a man.

4. It would be easy by tell-tale lamps on the train to tell whether the signals were burning.

The only disadvantage visible to me is that of expense and that would not be great. The truck would be of skeleton construction like a railroad velocipede throughout, and as they would have but a short distance to run on a good track every day the power required would be very small; it should not exceed $500 per equipment complete and certainly would not reach $1000. Just how many of these could be bought for the cost of one rear end collision such as North Haven I leave each railroad man to figure for himself.

J. E. JOHNSON, JR.

New York City.

A Proposal for Rear-End Signaling

To the Editor: The great publicity that has been given to the collisions on one of our great Eastern railroad systems has led all thinking persons to study the question, and any attempt to help has its own justification of publication. Possibly the following proposal will be found of some merit as a safeguard against rear-end collisions:

On the rear end of the rear car of the train suspend a quickly demountable gasoline-driven three-wheeled car, somewhat similar to the gasoline hand-car, on a frame of such a nature that the car can be lowered in three seconds. Equip this with a compressed air self-starter actuated by air from the air line of the brake system. Equip this also with torpedoes, flags and signal candles. Now, when a train is stopped let the flagman drop this car immediately on the track, detach air connection and start up the little car with the flagman on it. The flagman then runs back half or five-eighths of a mile, at an average speed of 25 miles per hour, taking a minute to a minute and a half. He drops the signals in the proper place. The number of the torpedoes should be known to the public so that the engineer of an oncoming train could not pass them without everybody in the train knowing it. After the flagman leaves these he either goes back to the train or remains and goes back on call. The total estimated time for the efficient carrying out of this proposal would be from 2½ to 3½ min. as against 10 min. of work which is

now done by the ordinary flagman. The main point is that it is a physical impossibility for a flagman to do the job well under present conditions, as far as my observations go, and there is usually only a perfunctory attempt to put out signals at the rear. Under the above proposal or some practical modification thereof the laying of signals at the rear of a train which has been stopped would be cheap and easy. The cost of the equipment suggested would be less than that of a single wreck, but the saving in time of, say, five minutes on a road where the travel is dense, would amount to some $25. Now if a train were stopped only once a month and this apparatus were used there would be a saving of at least $300 a year, or 60 per cent. of the maximum estimated capital cost of this method, on the basis that a train schedules 30 miles per hour and carries 400 people at 2½c. per mile.

In the above outline I have laid stress in my own mind, at least, on the low capital cost such an apparatus would have. In my judgment a great many improvements will be adopted if the capital cost is not excessive. This statement is made with due regard for the tremendous demand on capital for expansion of a really necessary and sane character.

W. McA. JOHNSON.

HARTFORD, CONN., September 15, 1913.

Tilting Versus Fixed Open-Hearth Furnaces

The Status of the Talbot Furnaces Discussed at the Brussels Meeting of the Iron and Steel Institute

One of the important papers read before the meeting in Brussels, September 1 to 4, inclusive, of the Iron and Steel Institute, was that presented by Benjamin Talbot, Middlesbrough, England, "On Modern Open-Hearth Steel Furnaces." The main points of the paper were printed at length in the last issue, and also incidentally in a separate article the details of the two new tilting furnaces at the plant of the Lackawanna Steel Company producing steel at the rate of over 20,000 tons each per month. The discussion, which the presentation of Mr. Talbot's paper brought on, is given below as submitted by the correspondent of *The Iron Age*. The discussion on the rest of the papers of the meeting will have to go over to next week's issue.

T. C. Hutchinson said that at Skinningrove, England, there was a 240-ton Talbot furnace which had been working for 2½ years with molten metal direct from the blast-furnace, working on Cleveland ores. He had no gathering or preliminary furnace, and he considered that with the metal he had to work, and without having to take it from the furnace as it was required at each cast, he had done remarkably well. He had got between 1100 and 1200 tons per week out of the furnace, and the life of the roof had varied from 16 to 20 weeks. They were so satisfied with the process and the results obtained that they were now putting down two 120-ton tilting furnaces to receive the metal from the first furnace working as a preliminary mixer, and to work the two 120-ton furnaces behind. He was sure that he would then get much better results, and greatly cheapen the cost. They were going to put tilting furnaces down instead of fixed furnaces, so that they could either take out 60 tons hot and leave 60 tons, or take out the whole 120 tons, and then refill.

Dr. Petersen, Düsseldorf, said during recent years a number of large open-hearth furnaces had been laid down in Germany, and in only one case was a tilting pattern erected. It might be taken that the German steelmen had looked carefully into this matter, and they seemed to think that the advantages of the tilting furnace were generally outweighed by its disadvantages, the greatest of which was the cost. At one steel works there was a 60-ton fixed furnace, taking four charges every twenty-four hours regularly, and it was making 1500 tons per week. The first cost was very low, and placing it against Mr. Talbot's 1200 tons, the question might very well be asked as to what was the advantage of the very expensive tilting furnace. The Witkowitz steel plant was the only one on the Continent where a Talbot furnace was at work, and the only place on the Continent where it was possible to compare the Talbot furnace with the fixed furnace. Reference was made in the paper to what he believed was the Hoesch process. In this connection Dr. Springorum had said last year at Leeds that the process was working very well at Dortmund. They had put in a 100-ton fixed furnace, and were making regularly 2½ to 3 charges, or about 300 tons, in a day, and 1800 tons in the week; and even if it were thought extraordinary that the Hoesch process should first take out the metal and then put it back again, it must not be forgotten that with this process was obtained the valuable phosphoric slag and he would like to ask if it were possible for the Talbot furnace to do the same as the Hoesch process, and give a phosphoric slag with 16 to 18 per cent. of phosphoric acid.

Dr. Adolphe Greiner, Société John Cockerill, Seraing, Belgium, said the reason the Americans had abandoned the Bessemer process for the open-hearth furnace was simply because they had too much phosphorus in their ores, and they could not get a good quality of steel rail with the Bessemer process. This was not the case, however, with other countries. Germany, Belgium and France had splendid deposits of ore in Lorraine, and these enabled them to make a first-class pig iron containing the right quantity of phosphorus from the Thomas process; and so it happened that these countries were the last to make the change to the Siemens-Martin furnaces. The phosphoric pig iron made out of the Lorraine ores enabled the best quality steel to be manufactured in the Thomas converter. The one thing against the open-hearth furnace was that it was not a cheap process, and it could not compete with the Thomas process for cheapness. Nevertheless, some considerable developments had been made with the open-hearth furnace.

There was yet another improvement in the open-hearth furnace which he considered of great importance, and that was the introduction of the tilting furnace. At present there were, on the one hand, the Americans and the English working the Siemens-Martin process, while on the other hand, in Germany, France and Russia it was always the basic converter. The question to be settled was how best to work to them to the best advantage and lowest price. What would be the result of the battle between the two processes no one could say. It was the customer who said what he wanted, and it was the man who paid who was the master.

Greville Jones, Clarence Iron Works, Middlesbrough, England, speaking with regard to the temperature of the flue gases, said he had taken temperatures at different periods of the charge at the Clarence Iron Works. The average was 388 deg. C., which did not compare unfavorably with Mr. Talbot's 472 deg. C. A very important point was whether steel could be manufactured with these furnaces over a period, say, of twelve months, more cheaply than with a fixed furnace. Mr. Hutchinson had mentioned that his roofs only lasted from 15 to 20 weeks. If the roof of Mr. Talbot's furnace only lasted this period, and the furnace then had to be taken off for a fortnight or three weeks for repairs, a very large amount of capital expenditure would be lying idle without any return.

Thomas Twyman, Middlesbrough, said it was quite possible to make changes consecutively in the Talbot furnace from 0.05 per cent. carbon to 0.7 per cent., and it was done commonly. He did not say they went down to 0.05 very often, because that was very low; but they did make almost continuously from a high-quality to a low-quality steel, and there was no trouble about it. The Talbot process did not make a slag with such a high per-

centage of phosphoric acid as in the Thomas process, but they made quite a salable product—16 to 17 per cent. was not unusual. In England, of course, there was always the question of sulphur, and that threw the process back a lot in reference to the slag, as fluorspar had to be used, which decreased the solubility of the phosphoric slag.

Dr. Greiner's remarks he regarded as very interesting, and, as to the United States, the development there seemed likely to be a combination of the Bessemer and the open-hearth, which would lend itself admirably to the treatment of pig iron containing 0.2 or 0.25 per cent. phosphorus, not of very high quality. Working on these lines, it was stated in the paper, it had been possible to produce 5000 tons in one week with one tilting furnace. It was, he thought, still an open question as to whether the Talbot could compete with the Bessemer or open-hearth process in the matter of cost. He thought that if we waited a little longer we might even hear that the open-hearth had come down to the Thomas costs. He could not answer Mr. Jones on the question of cheapness of manufacture. The output from the Talbot furnace in a given time was very large, and when Mr. Hutchinson spoke of 16 weeks as the life of his roofs 20,000 tons of steel was made in that time, and the period must be averaged over the 20,000 tons and not over the small charge of the open-hearth furnace. It was all a question of the cost per ton of steel produced.

Dr. Arthur Cooper, Northeastern Steel Company, Ltd., Middlesbrough, the president, said the question raised in the paper of the fixed furnace versus the tilting furnace was probably the most important one before steelmakers to-day. Mr. Talbot appeared to have struck the keynote when he said that the arguments against the tilting furnace were the initial capital cost and increased cost of upkeep. It was more than probable that during the next twelve months some definite information on the subject would be forthcoming. With a view to getting an interesting discussion on Mr. Talbot's paper he had himself written to the general director of the Witkowitz Works, where experiments were being made both with the fixed furnace and the tilting furnace, asking him to be good enough to come to the meeting and give the results of these experiments. He replied that the time was not yet ripe, but later on he hoped to have the opportunity.

Thomas Iron Company's Annual Meeting

The annual meeting of stockholders of the Thomas Iron Company was held at the office of the company at Hokendauqua, Pa., on Tuesday, September 9. The annual report of the business of the company for the past year was presented. The board of directors was unanimously re-elected to serve for the ensuing year, as follows: William H. Hulick and William P. Hardenbergh, New York City; Fred R. Drake, Andrew D. Chidsey and Ralph H. Sweetser, Easton, Pa.; J. Samuel Krause, Bethlehem, Pa., and Edwin Thomas, Catasauqua, Pa. After the stockholders' meeting the board met and organized. The following officers were elected to serve for the ensuing year: Ralph H. Sweetser, president and general manager; Edwin Thomas, vice-president; James W. Weaver, secretary and treasurer.

The Republic Iron & Steel Company, Youngstown, Ohio, has issued instructions to discontinue operations at its Mahoning Valley works after October 1, but there is no intention at the present time of dismantling the plant. The reason for this action is that, as the plant stands, it is suitable only for the manufacture of bar iron, and it has been the policy of the company, which was originally a bar-iron proposition, to go upon a steel manufacturing basis.

The new steel works of the Alton Steel Company, Alton, Ill., began operations Thursday, September 11, power being supplied then to the electrically driven apparatus from the Keokuk hydroelectric plant. It makes steel hoops and cotton ties. At the same time other manufacturing plants began to receive the full supply of current from the Keokuk works, a total of 13,000 hp. being delivered.

Safety Congress in New York Next Week

Supplementing the announcement made in the last issue of the Second Safety Congress, to be held September 22 to 25, inclusive, at the Hotel McAlpin, New York City, may be given a brief outline of the programme.

On Monday afternoon, September 22, various committee meetings are to be held, and on Tuesday morning at 10 a.m. is to be held what is called the educational session, at which Arthur Williams, of the American Museum of Safety, is to be the presiding officer, and in connection with which a safety men's round table is to be conducted by C. W. Price, assistant to the Industrial Commission of Wisconsin. Among those invited to enter the discussion at this session are C. B. Connelley, of the Carnegie Technical Schools, and William H. Doolittle, of the National Metal Trades Association. On Tuesday afternoon is to be held a fire prevention session, and the evening is to be devoted to an inspection of the American Museum of Safety at 29 West Thirty-ninth street.

On Wednesday morning, at 10 a. m., is to be held a session conducted by W. B. Wilson, Secretary of the Department of Labor, as presiding officer. On Wednesday afternoon, 2 p.m., over which James T. McCleary, secretary American Iron and Steel Institute, is to preside, there are to be reports from the divisions of the National Council for Industrial Safety, which is holding the convention, on federal bureaus, state bureaus, transportation, mines and on manufacturers' associations, the last report to be made by M. W. Mix, president Dodge Mfg. Company, Mishawaka, Ind., and on iron and steel, which report is to be made by L. H. Burnett, Carnegie Steel Company. Discussions are also announced by George Westinghouse on the manufacturers' division, and by Charles M. Schwab, Bethlehem Steel Company, on the iron and steel division.

A safety dinner is to be held on Wednesday evening at 8 p.m., with the Association of Iron and Steel Electrical Engineers. Judge E. H. Gary is announced as toastmaster of the dinner, and Governor John T. Tener of Pennsylvania and Secretary of Labor Wilson are to speak. The late William J. Gaynor was expected to make a speech of welcome, as mayor of the City of New York.

A business meeting is scheduled for Thursday morning at 10 a.m., and the afternoon has been reserved for a trip of inspection.

Smaller Decrease in Steel Orders

The statement of the United States Steel Corporation, issued September 10, briefly referred to in *The Iron Age* of last week, shows that the total of unfilled orders on the books of its subsidiaries August 31 was 5,223,468 tons, a decrease in the month of 175,888 tons or somewhat less than was expected. The table below gives the unfilled tonnage for each month back to December 30, 1910, and previous to that for the end of each year:

August 31, 1913	5,223,468	November 30, 1911	4,141,955
July 31, 1913	5,399,356	October 31, 1911	3,694,328
June 30, 1913	5,807,317	September 30, 1911	3,611,317
May 31, 1913	6,324,322	August 31, 1911	3,584,085
April 30, 1913	6,978,762	July 31, 1911	3,695,985
March 31, 1913	7,468,956	June 30, 1911	3,361,058
February 28, 1913	7,656,714	May 31, 1911	3,113,187
January 31, 1913	7,827,368	April 30, 1911	3,218,704
December 31, 1912	7,932,164	March 31, 1911	3,447,301
November 30, 1912	7,852,883	February 28, 1911	3,400,543
October 31, 1912	7,594,381	January 31, 1911	3,110,919
September 30, 1912	6,551,507	December 31, 1910	2,674,757
August 31, 1912	6,163,375	December 31, 1909	5,927,031
July 31, 1912	5,957,079	December 31, 1908	3,603,527
June 30, 1912	5,807,346	December 31, 1907	4,624,552
May 31, 1912	5,750,983	December 31, 1906	8,489,719
April 30, 1912	5,664,885	December 31, 1905	7,605,086
March 31, 1912	5,304,841	December 31, 1904	4,696,203
February 29, 1912	5,454,200	December 31, 1903	3,215,123
January 31, 1912	5,379,721	December 31, 1902	5,347,523
December 31, 1911	5,084,761		

The present statement shows the smallest total since that of December 31, 1911.

Preparations, not officially confirmed, are reported to be under way for the construction of a railroad bridge across the Mississippi River at the southern end of St. Louis, Mo., opposite the railroad yards at Dupo, Ill., for the accommodation of Illinois Central, the Iron Mountain and Missouri Pacific railroads, whose needs are in that locality rather than in the vicinity of the existing bridges.

The Iron and Metal Markets

Southern Pig Iron Higher

Considerable 1913 Sales at $11.50

Weakness in Some Finished Lines—Railroad Buying Still the Key to the Situation

Generally quieter conditions are reported in finished material, with prices weaker on several products. The pig iron market, on the other hand, is generally firmer and New York, eastern Pennsylvania and Alabama furnaces are making fair sales.

While $11 Southern No. 2 iron is still reported, it is iron for early shipment. The leading producers have made considerable sales at $11.50 for delivery through the year and a 6000-ton sale was made at $11.75 for the first quarter of next year. Alabama stocks decreased 8000 tons in August and further reduction has been made this month. Two important Southern producers are sold up for this year.

Canadian buying of foundry iron has been a feature at Buffalo and inquiry for 1914 is increasing. However, consumers of Northern irons are not in haste to pay the advance of 25 to 50 cents furnaces ask on iron that will be shipped next year.

In the Central West practically nothing has been done in Bessemer and basic irons. Further forge iron sales have been made in the Schuylkill Valley, making a total of over 20,000 tons in the past two weeks, for the most part at $14.75, delivered. Pipe iron has brought $15, Delaware River delivery.

The reports that Middlesbrough iron has been bought by Eastern cast iron pipe makers are not borne out. At 54s. 6d. abroad such iron would now cost $15.75 on Delaware River dock, if duty free, and it is not certain that pig iron will not finally be made duitable at a low rate.

In the Chicago market Lake Superior charcoal iron producers, following the recent clearing out of stocks at low prices, are making an uphill effort to re-establish the old advance over coke iron.

A falling off in specifications for billets and sheet bars, particularly the latter, is noticed in the Pittsburgh and Valley districts. An easier market for semi-finished steel in the East is indicated by the posssibility of $25 on good sized lots of rolling billets.

Railroad demand is plainly the key to the situation in finished lines. Rail purchases will be made in regular course, but on what scale is not yet known. If money can be had, there will be another car buying movement, but it is being made clear to car builders that the stimulus will come in the old way, through bargain prices, such as brought the heavy orders of early 1912. That in turn means prices for plates and shapes quite below present levels. With what is coming in week by week, steel companies are still some distance away from any general scramble for tonnage like that of two years ago.

The plate trade shows rather sharper competition. On new business 1.40c., Pittsburgh, is now more common than 1.45c. and in the past week a price of 1.35c. was brought out on a fair-sized Eastern order. A boat has been placed with the Great Lakes Engineering Works that calls for 3000 tons of steel.

Structural steel contracts are of fair volume. For bridge work on the Pacific coast the Northern Pacific has just placed 3000 tons with the leading fabricator and an Ohio bridge company has the contract for the new Portsmouth bridge, 2200 tons.

Large consumers of sheets are still holding off, though 2.10c. for No. 28 black sheets is admittedly low. Some producers are not willing to sell on that level.

The users of Lake Superior ores are already canvassing the price situation for 1914. In expectation of a reduction they are figuring very closely on this year's needs, so as to carry nothing over. If the pig iron market improves, ore firms will want to stop somewhere short of a return to the 1912 basis for next year, that having been 55 to 65 cents below this year's prices.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous.

	Sept. 17, 1913.	Sept. 10, 1913.	Aug. 20, 1913.	Sept. 18, 1912.
Pig Iron, Per Gross Ton:				
Foundry No. 2 X, Philadelphia..	**$15.85**	$15.75	$15.65	$16.75
Foundry No. 2, Valley furnace.	14.00	14.00	14.00	14.50
Foundrwy No. 2 S'th'n, Cin'ti..	14.25	14.25	14.00	16.00
Foundry No. 2, Birmingham, Ala.	11.00	11.00	10.75	12.75
Foundry No. 2, furnace, Chicago*	15.00	15.00	15.00	16.50
Basic, delivered, eastern Pa....	**15.25**	15.00	15.25	16.00
Basic, Valley furnace	14.00	14.00	14.00	14.25
Bessemer, Pittsburgh	16.65	16.65	16.65	15.90
Malleable Bessemer, Chicago*..	15.00	15.00	15.00	17.00
Gray forge, Pittsburgh	14.25	14.25	14.25	14.65
Lake Superior charcoal, Chicago	14.75	14.75	15.00	17.75
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh ...	25.00	25.00	25.00	24.00
Open-hearth billets, Pittsburgh.	24.00	24.00	25.00	24.50
Open-hearth sheet bars, Pgh....	25.00	25.00	25.50	25.50
Forging billets, Pittsburgh.....	30.00	30.00	32.00	32.00
Open-hearth billets, Philadelphia	*25.00*	26.00	28.00	27.90
Wire rods, Pittsburgh	*27.00*	27.50	28.00	27.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	14.00	14.00	14.00	17.00
Iron rails, Philadelphia	17.50	17.50	17.50	17.00
Carwheels, Chicago	12.75	12.75	12.75	14.50
Carwheels, Philadelphia	**13.00**	12.50	12.00	14.25
Heavy steel scrap, Pittsburgh...	12.25	12.25	12.25	14.25
Heavy steel scrap, Chicago.....	10.25	10.25	10.50	12.75
Heavy steel scrap, Philadelphia	**11.75**	11.50	11.50	14.50
Finished Iron and Steel,				
Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill...	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	*1.35*	1.37½	1.42½	1.42½
Iron bars, Pittsburgh	1.55	1.55	1.60	1.45
Iron bars, Chicago	*1.35*	1.40	1.40	1.45
Steel bars, Pittsburgh	1.40	1.40	1.40	1.35
Steel bars, New York.....	1.56	1.56	1.56	1.51
Tank plates, Pittsburgh	1.40	1.40	1.45	1.40
Tank plates, New York.....	1.56	1.56	1.61	1.56
Beams, Pittsburgh	1.40	1.40	1.45	1.40
Beams, New York	1.56	1.56	1.61	1.56
Angles, Pittsburgh	1.40	1.40	1.45	1.40
Angles, New York, future.....	1.56	1.56	1.61	1.56
Skelp, grooved steel, Pittsburgh	1.35	1.35	1.40	1.30
Skelp, sheared steel, Pittsburgh.	1.45	1.45	1.45	1.35
Steel hoops, Pittsburgh.....	1.60	1.60	1.50	1.45
Sheets, Nails and Wire,				
Per Pound to Large Buyers:				
Sheets, black, No. 28, Pittsburgh	2.15	2.15	2.20	2.10
Wire nails, Pittsburgh.....	1.65	1.65	1.65	1.70
Cut nails, f.o.b. Eastern mills..	*1.70*	1.75	1.75	1.70
Cut nails, Pittsburgh	1.60	1.60	1.60	1.60
Fence wire, ann'l'd.0 to 9, Pgh.	1.45	1.45	1.45	1.50
Barb wire, galv., Pittsburgh....	2.05	2.05	2.05	2.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville, Per Net Ton at Oven:	Sept. 17, 1913.	Sept. 10, 1913.	Aug. 20, 1913.	Sept. 18, 1912.
Furnace coke, prompt shipment.	$2.25	$2.25	$2.50	$2.40
Furnace coke, future delivery..	2.25	2.25	2.50	2.40
Foundry coke, prompt shipment	2.90	2.90	2.90	2.60
Foundry coke, future delivery..	3.00	3.00	3.00	2.75

Metals, Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	16.87½	16.87½	16.00	17.75
Electrolytic copper, New York..	**16.75**	16.62½	15.75	17.62½
Spelter, St. Louis	5.65	5.75	5.70	7.45
Spelter, New York.....	5.80	5.90	5.85	7.60
Lead, St. Louis.....	4.62½	4.65	4.67½	4.95
Lead, New York	4.75	4.75	4.75	5.10
Tin, New York	**42.60**	42.50	41.25	49.00
Antimony, Hallett, New York..	7.75	7.75	7.75	8.30
Tin plate, 100-lb. box, Pittsburgh	$3.50	$3.50	$3.50	$3.60

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per. sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.....	.10
Gauges under 3-16 in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths, under 3 ft., to 2 ft., inclusive.....	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.40c. to 1.45c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.....	.10
H-beams over 18 in.....	.10
Angles over 6 in. on one or both legs.....	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909.....	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail).....	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.....	.20 to .80
Deck beams and bulb angles.....	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft., to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Rods and Wire.—Bessemer, open-hearth and chain rods, $27. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.45; galvanized, $1.85. Galvanized barb wire, to jobbers, $2.05; painted, $1.65. Wire nails, to jobbers, $1.65.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12 &12½	13	14	15	16
Annealed	$1.65	$1.70	$1.75	$1.80	$1.90	$2.00	$2.10	$2.20
Galvanized	2.10	2.10	2.15	2.20	2.30	2.40	2.80	2.90

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (full weight), in effect from August 8, 1913, and iron pipe (full weight), from June 2, 1913:

Butt Weld.

Steel. Inches.	Black.	Galv.	Iron. Inches.	Black.	Galv.
⅛, ¼ and ⅜	73	52½	⅛ and ¼	66	47
½	77	66½	⅜	65	46
¾ to 3	80	71½	½	69	56
			¾ to 2½	72	61

Lap Weld.

2	76	67½	1¼	56	45
2½ to 6	78	69½	1½	67	56
7 to 12	75	64½	2	68	58
13 to 15	52	..	2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted.

1 to 3, butt	78	69½	1 to 1½, butt	70	59
2, lap	74	65½	2, butt	70	59
2½ to 6, lap	76	67½	1¼, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap	68	59

Butt Weld, extra strong, plain ends.

⅛, ¼ and ⅜	68	57½	⅜	63	52
½	73	66½	½	67	60
¾ to 1½	77	70½	¾ to 1½	71	62
2 to 3	75	71½	2 and 2½	72	63

Lap Weld, extra strong, plain ends.

2	73	64½	1½	65	59
2½ to 4	75	66½	2	66	58
4½ to 6	74	65½	2½ to 4	70	61
7 to 8	67	56½	4½ to 6	69	60
9 to 12	62	51½	7 and 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends.

½	63	56½	½	57	49
¾ to 1½	66	59½	¾ to 1½	60	52
2 to 2½	68	61½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends.

2	63	56½	2	55	49
2½ to 4	65	58½	2½ to 4	60	54
4½ to 6	64	57½	4½ to 6	59	53
7 to 8	57	46½	7 to 8	52	42

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads on lap-welded steel, in effect from May 29, 1913, and standard charcoal-iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap-Welded Steel.		*Standard Charcoal Iron.*	
1¾ and 2 in.	60	1½ in.	44
2¼ in.	57	1¾ and 2 in.	48
2½ and 2¾ in.	63	2¼ in.	44
3 and 3¼ in.	67	2½ to 2¾ in.	53
3½ to 4½ in.	69	3 and 3¼ in.	55
5 and 6 in.	63	3½ to 4½ in.	58
7 to 13 in.	60		

Locomotive and steamship special grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.

	Cents per pound
Nos. 3 to 8	1.55 to 1.60
Nos. 9 and 10	1.60 to 1.65
Nos. 11 and 12	1.65 to 1.70
Nos. 13 and 14	1.70 to 1.75
Nos. 15 and 16	1.80 to 1.85

Box Annealed Sheets, Cold Rolled.

Nos. 10 and 11	1.80 to 1.90
No. 12	1.80 to 1.90
Nos. 13 and 14	1.85 to 1.95
Nos. 15 and 16	1.90 to 2.00
Nos. 17 to 21	1.95 to 2.05
Nos. 22 and 24	2.00 to 2.10
Nos. 25 and 26	2.05 to 2.15
No. 27	2.10 to 2.20
No. 28	2.15 to 2.25
No. 29	2.20 to 2.30
No. 30	2.30 to 2.40

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11	2.15 to 2.30
No. 12	2.25 to 2.40
Nos. 13 and 14	2.25 to 2.40
Nos. 15 and 16	2.40 to 2.55
Nos. 17 to 21	2.55 to 2.70
Nos. 22 and 24	2.70 to 2.85
Nos. 25 and 26	2.85 to 3.00
No. 27	3.00 to 3.15
No. 28	3.15 to 3.30
No. 29	3.30 to 3.45
No. 30	3.45 to 3.60

Pittsburgh

PITTSBURGH, PA., September 17, 1913.

The new demand for finished iron and steel is reported by some mills to have been slightly more active, but the expected September buying movement has not developed, nor are there any signs of it. Consumers are still placing orders cautiously. If the volume of business of this kind was large enough to keep the mills filled they would be well satisfied, as it is preferable to contracts, but it is small and most mills are running on old orders, which are fast being cleaned up. It is believed that if the Interstate Commerce Commission allows the railroads to advance freight rates they may come into the market for some material, but as long as the money situation continues tight it is not likely that they will be free buyers. Under the readjustment in prices on all kinds of material that has been under way for some time the market has held up fairly well, but on some lines prices are still weak and there is no incentive for consumers to anticipate. New demand for pig iron is at a standstill; specifications coming into the steel mills for billets and sheet bars are showing a falling off; finished material is only in fair demand, and the general situation is therefore not satisfactory. The decline in coke has not stimulated the demand, which is dull, and the scrap market is lifeless. Prices of sheets are a little lower this week, No. 28 Bessemer black having sold in some cases at 2.10c., but some good sized contracts for blue annealed have been closed at 1.60c. Until a better buying movement develops, conditions will not improve, and the tendency of the market will likely be toward still lower values.

Pig Iron.—There is no new active inquiry, buyers holding off in the belief that prices may go lower. The last authentic sales of Bessemer were reported at $15.75, Valley furnace, for September delivery, but one or two makers have recently quoted $15.50, Valley furnace, or $16.40, Pittsburgh, for delivery over the remainder of the year. Basic is dull and seems to be pegged at $14, Valley furnace, with some sellers quoting as high as $14.50, but no business has been closed at this price. Small lots of foundry iron are being sold for prompt delivery at about $14, Valley furnace, or slightly less, for No. 2, but foundries are not anticipating their wants. A sale of 1500 tons of forge iron is reported at about $13.35, Valley furnace. We quote: Bessemer, $15.75 to $16; basic, $14; malleable Bessemer, $13.75 to $14; No. 2 foundry, $14; gray forge, $13.35 to $13.50, all at Valley furnace, the freight rate for delivery to the Cleveland and Pittsburgh districts being 90c. a ton.

Billets and Sheet Bars.—Consumers being covered by contracts, on which the mills are making prompt deliveries, there is practically no new inquiry. Some of the steel mills report that specifications are falling off, notably from sheet and tin plate mills that are running at a lower rate of operation on account of the dull demand. We quote open-hearth billets for prompt delivery and also for shipment over remainder of the year at $24 to $24.50; open-hearth sheet bars for the same deliveries at $25 to $25.50, delivered to buyers' mills in the Pittsburgh district. For billets and sheet bars made from Bessemer steel the larger mills are asking about $1 a ton advance over these prices. We quote forging billets at $30 to $31, and axle billets at $26 to $27, maker's mill.

Steel Rails.—Small orders for standard sections, ranging from about 200 to 1000 tons, are being placed, but none of the trunk lines is yet in the market with actual inquiries for 1914 rails. Four of the new 14 open-hearth furnaces at the Edgar Thomson plant of the Carnegie Steel Company are in operation, and that plant is rolling rails from its own open-hearth stock, the first time this has been done there. A fairly active demand is in progress for light rails, but the rerolling mills continue to cut prices $1.50 to $2 a ton, as against rails rolled from billets. We quote splice bars at 1.50c. per lb., and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45 lb. sections, 1.25c.; 16 and 20 lb., 1.30c.; 12 and 14 lb., 1.35c., and 8 and 10 lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Plates.—No new car orders have been placed the past week and no definite inquiries are out. An inquiry is in the market for 2500 to 3000 tons of plates for Los Angeles aqueduct work, and there is also a reported inquiry for 50 miles of riveted pipe for delivery in the West. The two local steel car companies report that while they are well filled to the end of the year, they are running nearly altogether on old orders. The new demand for plates is only fair, and some of the mills are going after orders aggressively. We quote ¼ in. and heavier tank plate at 1.40c. to 1.45c., but on desirable specifications the lower price has been shaded by some mills.

Structural Material.—New inquiry has been more active. The Jones & Laughlin Steel Company has taken 300 tons for a new foundry for Hubbard & Co. in this city; the McClintic-Marshall Construction Company, 1100 tons for new shops for the Lake Shore Railroad near Toledo, Ohio; the American Bridge Company, 800 tons for a new foundry building in the West; the Mt. Vernon Bridge Company, a bridge across the Ohio River at Portsmouth, Ohio, about 2500 tons, which will be rolled by the Carnegie Steel Company. Bids were opened September 11 for the new Masonic Temple in this city, but the award has not yet been made. We quote beams and channels up to 15-in. at 1.40c. to 1.45c., Pittsburgh.

Wire Rods.—There is a more active demand than for some time, and frequent sales are made of both Bessemer and open-hearth, mostly in small lots, for early delivery. Prices are lower, in sympathy with the reduction in wire products made some time ago. We quote Bessemer open-hearth and chain rods at $27 to $27.50.

Ferroalloys.—Some inquiry is out for ferromanganese for delivery this year, and sales have been made of 300 to 400 tons on the basis of about $55, Baltimore. With the prospect of some domestic capacity in ferromanganese coming on the market late in the year, which is now pretty well known among the trade, consumers are inclined to defer contracts for next year's delivery. Sales of three or four cars of 50 per cent. ferrosilicon have been made at the full price of $75, delivered in the Pittsburgh district. We quote 80 per cent. foreign ferromanganese at $55, Baltimore, the freight rate to the Pittsburgh district being $2.16 a ton. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $75; over 100 tons to 60 tons, $74; over 600 tons, $73, Pittsburgh. We quote 10 per cent. ferrosilicon at $22; 11 per cent., $23, and 12 per cent. $24, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnaces.

Skelp.—The pipe mills are busy, and this is reflected in an active demand for skelp. Makers are filled up for some time ahead. Prices are firm, a sale being reported of 600 tons of grooved steel skelp at 1.35c. delivered. We quote grooved sheared skelp at 1.35c. to 1.40c.; sheared steel skelp, 1.40c. to 1.45c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.65c. to 1.70c., delivered to buyers' mills in Pittsburgh district.

Iron and Steel Bars.—The large business in steel bars has been pretty well placed, and new demand is confined to small lots to cover current needs. Specifications against contracts for steel bars have of late been only fairly satisfactory, some consumers holding up altogether, while others are taking in less than expected. Reports of a break in the price of steel bars are not confirmed here, the leading makers stating they are holding rigidly to 1.40c. The mills have a large amount of business on their books, and if this is taken out as per contract they will have all they can handle for the next three or four months. The new demand for steel bars for reinforcing purposes continues heavy, and the mills are considerably back in shipments on that specialty. The trade in iron bars is dull, the demand being only for small lots, and some of the mills are running short of work. We quote steel bars for forward delivery at 1.40c. and for shipment from warehouse in small lots at 1.90c. We quote iron bars at 1.55c. to 1.65c. The mills continue to charge $1 extra per ton for twisting ¾-in. and larger steel bars and $2 extra for ½ to ⅝ in. In some cases, however, these extras are being shaded.

Sheets.—Large consumers are holding back, not knowing whether to place contracts for delivery ahead at present prices, which are admittedly low, fearing further declines. Two or three leading makers will not sell for next year's delivery at present prices, and will accept orders only for reasonably prompt shipment. On some of the business being placed, No. 28 black sheets are bringing 2.15c. up to 2.25c., but 2.10c. has been named by a few mills on especially attractive orders, this price not being general by any means. On galvanized, the market is ruling from 3.15c. to 3.30c., the latter price having been paid this week on a fairly large order for early delivery. Operations of mills are quieting down, two or three leading makers having adopted the plan of shutting down at the end of the first or second turn on Friday of each week

and remaining closed until Monday morning. None is running full. Some fairly large tonnage has been placed in blue annealed sheets on the basis of 1.60c. to 1.65c. and prices are firmer than on black or galvanized. We quote Nos. 9 and 10 blue annealed sheets at 1.60c. to 1.65c.; No. 28 Bessemer black, 2.15c. to 2.25c.; No. 28 galvanized, 3.20c. to 3.30c.; No. 28 tin mill black plate, 2.15c. to 2.20c., and No. 30, 2.20c. to 2.25c. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—It is between seasons and there is no new buying, while specifications against contracts are only fair. The rate of mill operations is slowing down. Some of the mills are now shutting down on Friday morning each week and staying closed until Monday morning. The Pope works of the Phillips Sheet & Tin Plate Company at Steubenville, Ohio, has been closed, but its Clarksburg and Weirton plants are running practically full. It is expected that about October 15, or perhaps November 1, the mills will fix prices on tin plate to the large consumers on their contracts for winter and spring delivery. Not enough new business is being placed to fix prices, but we continue to quote nominally at $3.50 to $3.60 for 100-lb. cokes and 100-lb. ternes at $3.35 to $3.45, f.o.b. mill, Pittsburgh.

Spikes.—The new demand is still mostly for small lots which, however, aggregate considerable business. The Chicago, Milwaukee & St. Paul has placed 5000 kegs with a local maker. Specifications are quiet, and prices are only fairly strong. We quote railroad spikes in base sizes, 5½ x 9/16 in., at $1.65 to $1.70, and small railroad and boat spikes in carload and larger lots at $1.75 to $1.80 per 100 lb., f.o.b. Pittsburgh.

Bolts and Rivets.—Makers report new demand for nuts and bolts in the first half of September to have been considerably heavier than in the last half of August, and prices are firmer. The new demand for rivets is fairly active, but jobbers and consumers are still confining their orders to small lots to cover current needs. Owing to the uncertain outlook, there is no disposition to anticipate requirements. We quote button-head structural rivets at $1.90 in large lots and $2 in small lots, and cone-head boiler rivets at $2 in large lots and $2.10 in small lots, terms 30 days net, less 2 per cent. for cash in 10 days. Regular discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 10% off
Small carriage bolts, cut threads	75 and 5% off
Small carriage bolts, rolled threads	75 and 10% off
Large carriage bolts	70 and 2½% off
Small machine bolts, cut threads	75 and 10% off
Small machine bolts, rolled threads	75, 10 and 5% off
Large machine bolts	70 and 7½% off
Machine bolts with C.P.C. and T nuts, small	75 and 5% off
Machine bolts with C.P.C. and T nuts, large	70% off
Square hot pressed nuts, blanked and tapped	$5.70 off list
Hexagon nuts	$6.30 off list
C.P.C. and R. square nuts, tapped and blank.	$5.70 off list
Hexagon nuts, ⅝ and larger	$6.60 off list
Hexagon nuts smaller than 9/16	$7.20 off list
C.P. plain square nuts	$5.20 off list
C.P. plain hexagon nuts	$5.50 off list
Semi-finished hexagon nuts, ⅝ and larger	85% off
Semi-finished hex. nuts smaller than 9/16	85 and 10% off
Rivets, 7/16 x 6½, smaller and shorter	75, 10 and 10% off
Rivets, metallic tinned, bulk	3½c. per lb. net extra
Rivets, tin plated, bulk	1½c. per lb. net extra
Rivets, metallic tinned, packages	70, 10 and 10% off
Standard cap screws	75, 10, 10 and 7½% off
Standard set screws	75, 10, 10 and 7½% off

Shafting.—Conditions in this trade are unsatisfactory. It is stated that the new demand is equal to only about 35 per cent. of capacity. The shafting makers are running probably to an average of 85 per cent. of capacity, but business on the books is being rapidly cleaned up. The automobile trade about six weeks ago covered its requirements for some time ahead, but is not specifying freely. The regular discount on cold-rolled shafting remains at 60 per cent. off in carloads and 55 per cent. in small lots, delivered in base territory, but on desirable orders 62 is being named by all the makers.

Hoops and Bands.—The new demand is mostly for small lots, but the makers report that during the first half of September specifications against contracts have shown an increase over the last half of August. The cooperage plants are taking in a considerable tonnage of hoops at present. We quote steel hoops at 1.60c., and bands at 1.40c., with extras on the latter as per the steel bar card. On very desirable specifications for hoops, several mills are naming 1.50c., but this price is not general.

Wire Products.—The wire trade is somewhat exercised over the fact that a syndicate buying house recently sent out letters stating that the $1.65 price on wire nails was not being firmly held, but that $1.60 could be done. Local makers state that this information is incorrect, and have sent letters to their traveling men and sales agents, instructing them to hold firmly to the $1.65 basis; they further state that local jobbers have paid $1.65 for nails and are still doing so. In certain competitive sections, such as the Ironton, Ohio, district, nails have been sold that net back $1.60, but this was to meet the competition of Ohio River mills. A very heavy business in wire nails and wire has been entered by the mills, and specifications against these contracts are coming in quite freely. We quote: Wire nails to jobbers, $1.65; cut nails, $1.60; plain annealed wire, $1.45; galvanized barb wire, $2.05, and painted barb wire, $1.65, f.o.b. Pittsburg[1], per 100 lb., usual terms, actual freight added to point of delivery.

Merchant Steel.—Mills report the new demand in the first half of September slightly better than in the last half of August, but it is still confined mostly to small lots to cover current needs. Jobbers and consumers are carrying as light stocks as possible, in view of the uncertainty as to whether present prices will hold. Shipments against contracts are fairly heavy. Nominal prices, which are being shaded more or less, depending on the order, are as follows: Iron finished tire, 1½ x ½ in., and larger, 1.40c., base; under 1½ x ½ in., 1.55c.; planished tire, 1.60c.; channel tire, ¾ to ⅞ and 1 in., 1.90c. to 2c.; 1⅛ in. and larger, 2c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.75c.; concave and convex, 1.80c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.85c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

Standard Pipe.—The report that the Wichita-Quapaw Natural Gas Company of Kansas is in the market for 40 miles of 16-in. line pipe is denied by one of the officials of the company, who states that it is not in the market at present for any large pipe. The new demand for lap-weld pipe so far this month has been about as heavy as in the second half of August, and in the last few days has been quite active. The leading mills are well filled up on lap-weld and line pipe over the remainder of the year, but the new demand for butt weld continues quiet. Discounts on both iron and steel pipe are well maintained.

Boiler Tubes.—New business having fallen off to some extent, competition among the mills making boiler tubes is sharper than for some time. The mills still have work for several months on old orders, and specifications are coming in freely. Discounts on iron and steel boiler tubes are not being firmly maintained.

Old Material.—The local market is practically lifeless. Consumers are covered for some time ahead, and in spite of the low prices ruling are not interested. Several small sales of machine shop turnings, aggregating probably 500 tons, are reported at about $7.25 delivered to buyers' mills in the Pittsburgh district. We note sales of about 700 tons of selected heavy steel scrap at about $12.75 delivered. Dealers quote as follows, per gross ton, for delivery in the Pittsburgh district:

Selected heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$12.75 to	$13.00
Ordinary steel scrap	12.25 to	12.50
Compressed side and end sheet scrap		10.50
No. 1 foundry cast	12.75 to	13.00
No. 2 foundry cast	11.50 to	11.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.00 to	8.25
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	14.50 to	14.75
No. 1 railroad malleable stock	11.50 to	11.75
Grate bars	8.25 to	8.50
Low phosphorus melting stock	15.75 to	16.00
Iron car axles	24.50 to	25.00
Steel car axles	17.50 to	17.75
Locomotive axles, steel	21.00 to	21.50
Locomotive axles, iron	25.50 to	26.00
No. 1 busheling scrap	12.00 to	12.25
No. 2 busheling scrap	7.50 to	7.75
Old carwheels	13.75 to	14.00
*Machine shop turnings	7.25 to	7.50
*Cast-iron borings	8.00 to	8.25
†Sheet bar crop ends	14.00 to	14.25
Old iron rails	14.50 to	14.75
No. 1 railroad wrought scrap	13.75 to	14.00
Heavy steel axle turnings	9.00 to	9.25
Stove plate	8.25 to	8.50

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
†Shipping point.

Coke.—The break in prices of about 25c. a ton on standard Connellsville furnace coke has not stimulated the demand, which is very dull. No inquiries are in the market. Several leading coke makers state they have not made a sale in more than a week. It is understood the Producers Coke Company is still holding standard makes of furnace coke at $2.50, but other sellers are offering it freely at $2.25 at oven. We quote standard makes of furnace coke for September and forward delivery at $2.25 to $2.50, and best grades of 72-hr. foundry coke at $2.90 to $3, per net ton at oven.

Chicago

CHICAGO, ILL., September 17, 1913.—(*By Telegraph.*)

In this market the resumption of buying by the railroads appears to be the key by means of which the avenues of renewed activity will be opened. That such buying will materialize before the close of the year, and will cover not only rails but equipment of all kinds, is the well defined expectation based on tentative estimates now being made. In the immediate present the market is encouraged by an increase of steel-bar specifications from the implement interests and by the general report from fabricators indicating an average of four months' bookings in the future. In the absence of such new business as might serve to test the strength of steel prices, concessions in quotations apparently show no increase. Prices for bar iron are lower. Pig-iron sales are scattered and do not aggregate an important tonnage. Producers are assuming an increasingly firm position, an attitude due almost entirely to the furnace capacity out of blast. The scrap market exhibits little or no ability to recuperate under the steady pressure which a too abundant supply continues to exert. In general, the present market is a waiting one in which the feeling is more hopeful than otherwise.

Pig Iron.—With the situation fairly well defined as regards both Southern and Northern furnaces, the market for charcoal iron is still in a large measure the center of interest. With what success the charcoal furnaces will be able to re-establish their product upon a basis with the usual differential over coke irons is a matter of conjecture. Thus far but little advance has been made in that direction. A pronounced firmness is noted in the position of producers of coke iron both in the Southern and Lake districts. This is easily explained, despite the scattering and light tonnage of new business offering because of the large number of stacks out of blast. For the capacity likely to be in blast for the remainder of the year furnace books are unquestionably well filled. Among the consumers it is also probable that most of the buying for fourth quarter has been done. Most of the current inquiries are aimed to bring out quotations for delivery of iron running into the first quarter and first half, but with the exception of a few sales the only quotations that have been brought out are at an advance of 50c. over last quarter prices. For local iron, $15 at the furnace is now the minimum quotation. For Birmingham irons, $11.50 is being asked by some of the principal producers, who also have very little tonnage open for sale. Iron can still be secured, however, on the basis of $11, Birmingham. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4	$14.75 to $15.25
Northern coke foundry, No. 1	15.50 to 16.00
Northern coke foundry, No. 2	15.00 to 15.50
Northern coke foundry, No. 3	14.50 to 15.00
Southern coke, No. 1 foundry and No. 1 soft	15.85 to 16.35
Southern coke, No. 2 foundry and No. 2 soft	15.35 to 15.85
Southern coke, No. 3	14.85 to 15.35
Southern coke, No. 4	14.35 to 14.85
Southern gray forge	14.35 to 14.85
Southern mottled	14.10 to 14.60
Malleable Bessemer	15.00 to 15.50
Standard Bessemer	18.40
Basic	15.00 to 15.50
Jackson Co. and Kentucky silvery, 6 per cent	18.40
Jackson Co. and Kentucky silvery, 8 per cent	19.40
Jackson Co. and Kentucky silvery, 10 per cent	20.40

Cast-Iron Pipe.—Makers of cast-iron pipe see in current business an improvement as compared with the tonnages available during the past several months. Bids have been taken at Madison, Wis., on 1300 tons of 30-in. pipe and at Cleveland, Ohio, on 3000 tons of 48-in. At East Grand Rapids, Mich., a contract for 300 tons has been awarded. We quote as follows, per net ton, Chicago: Water pipe, 4-in., $28; 6 to 12 in., $26; 16-in. and up, $25, with $1 extra for gas pipe.

(By Mail)

Rails and Track Supplies.—Tentative negotiations between a number of the Western railroads and the rail mills point to an early contracting in a number of instances. Expectation grows stronger also that railroad buying before the close of the year will cover requirements of various kinds, including cars in particular. The possible passage of legislation requiring the substitution of all-steel passenger equipment for wooden coaches is a matter of considerable interest. We quote standard railroad spikes at 1.70c. to 1.75c., base; track bolts with square nuts, 2.25c., base, all in carload lots, Chicago; tie plates, $30 to $32, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Reports from a large number of fabricating shops indicate that fabricators have on their books an average of four months' work before them. Their outlook is also encouraging from the standpoint of the new orders materializing. Except for that work which runs into larger tonnages and is particularly desirable prices are fairly well maintained. Contracts for fabricated steel noted during the past week total approximately 6000 tons, of which the largest items were 1485 tons for the Fine Arts building of the Panama-Pacific Exposition and 1604 tons for Main Street bridge at Lafayette, Ind., both of which were awarded to the American Bridge Company. This company will also furnish 618 tons for the extensions to the Allis-Chalmers plant, West Allis, Wis., and 196 tons for the State hospital at Monroe, Wash. The Chicago Steel Products Company will fabricate 447 tons for the Royal Hippodrome, Chicago. The Lackawanna Bridge Company took 384 tons of bridge steel for the Chicago & Eastern Illinois bridge at Clinton, Ind.; the Kansas City Structural Steel Company, 672 tons for the Kansas City Terminal Railway Company power house, and the Kenwood Bridge Company, 465 tons of columns for the J. R. Watkins Medical Company, Winona, Minn. No new developments affecting the mill situation on plain shapes have appeared and the real strength of current prices has not been subject to any real test. We quote for Chicago delivery from mill, 1.63c.

From jobbers' stocks we quote for Chicago delivery 1.95c.

Plates.—In response to the activity of the mills seeking plate business only scattering orders of moderate tonnage are being developed. Most of this business is being placed on the basis of 1.40c., Pittsburgh, and there is some contracting for forward deliveries on this basis also. The aggressive campaigning for business is rather too apparent to be compatible with a generally strong situation. At the same time plate mills are building largely upon the prospect of large tonnages of car steel being placed during the fall months. We quote for Chicago delivery from mill 1.58c. to 1.63c.

On plates from jobbers' stocks for Chicago delivery we quote 1.95c.

Bars.—Makers of bar steel are deriving some encouragement from the increase of specifications being received from the implement interests. The past week has shown a decided improvement in this respect, and there are no apparent breaks in the steel-bar market. New orders for bar iron are light and it seems probable that local mills which operated last month at about 70 per cent. capacity will fall short of this rate by 5 or 10 per cent. during September. Bar-iron prices show further declines. We quote for mill shipment as follows: Bar iron, 1.35c. to 1.37½c.; soft steel bars, 1.58c.; hard steel bars, 1.50c.; shafting in carloads, 60 per cent. off; less than carloads, 55 per cent. off.

The active pushing of concrete work to completion before the advent of cold weather has sustained a brisk demand for reinforcing bars from store. Standard bars also are in better demand than many other of the allied products. Shafting shows some weakness and our quotation has been revised. For delivery from store we quote soft steel bars, 1.85c.; bar iron, 1.85c.; reinforcing bars, 1.85c. base, with 5c. extra for twisting in sizes ½ in. and over, and usual card extras for smaller sizes; shafting 55 per cent. off.

Sheets.—Reports of more marked concessions in the prices of both black and galvanized sheets are the only new features in this market. The tonnage offering continues to be unsatisfactory from the standpoint of producers. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.83c. to 1.88c.; No. 28 black, 2.33c. to 2.38c.; No. 28 galvanized, 3.38c. to 3.43c.

We quote for Chicago delivery from store, No. 10 blue annealed, 2.15c.; No. 28 black, 2.75c.; No. 28 galvanized, 4c.

Rivets and Bolts.—Except for the interest that attaches to the extent of concessions being made in connection with current quotations for bolts and rivets, as well, the market is without interest as regards these materials. We quote from mill as follows: Carriage bolts up to ⅝ x 6 in., rolled thread, 75-10-7½; cut thread, 75-12½; larger sizes, 70-12½; machine bolts up to ⅜ x 4 in., rolled thread, 75-10-12½; cut thread, 75-10-7½; large size, 70-10-5; coach screws, 80-12½-5; hot pressed nuts, square head, $6 off per cwt., hexagon, $6.70 off per cwt. Structural rivets, ¾ to 1¼ in., 1.98c. to 2.03c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

We have revised our discounts on bolts and nuts out of store in keeping with the general weakness prevailing for these items. Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ⅜ x 4 in., 70-5-10; larger sizes, 70-7½; carriage bolts up to ⅜ x 6 in., 75-5; larger sizes, 70-2½ off. Hot pressed nuts, square head, $5.50, and hexagon, $6.20 off per cwt.

Wire Products.—The booking of wire and wire nails at the recently revised prices has been decidedly gratifying, and the trade in wire products has assumed a very substantial footing based upon bookings extending well into the future. Prices to jobbers are as follows: Plain wire, No. 9 and coarser, base, $1.63; wire nails, $1.83; painted barb wire, $1.83; galvanized, $2.20; polished staples, $1.83; galvanized, $2.15, all Chicago.

Old Material.—The local scrap market continues to sag of its own weight and nearly all grades of scrap may be had at lower prices. With one or two exceptions all grades of old material are obtainable freely and in most instances dealers are finding it difficult to place the tonnage offered them. Melters are discriminating in their purchases, taking only the best material offering and generally forcing a concession before purchasing. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.

Old iron rails	$14.00 to $14.50
Old steel rails, rerolling	12.00 to 12.50
Old steel rails, less than 3 ft.	11.25 to 11.75
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	12.75 to 13.25
Heavy melting steel scrap	10.25 to 10.75
Frogs, switches and guards, cut apart	10.25 to 10.75
Shoveling steel	10.00 to 10.50
Steel axle turnings	7.25 to 7.75

Per Net Ton.

Iron angles and splice bars	$13.25 to $13.75
Iron arch bars and transoms	13.75 to 14.25
Steel angle bars	9.75 to 10.00
Iron car axles	20.25 to 20.75
Steel car axles	15.75 to 16.25
No. 1 railroad wrought	10.25 to 10.75
No. 2 railroad wrought	9.50 to 10.00
Cut forge	9.50 to 10.00
Steel knuckles and couplers	9.75 to 10.25
Steel springs	10.00 to 10.50
Locomotive tires, smooth	11.25 to 11.75
Machine shop turnings	4.90 to 5.15
Cast and mixed borings	4.75 to 5.25
No. 1 busheling	8.75 to 9.25
No. 2 busheling	6.75 to 7.25
No. 1 boilers, cut to sheets and rings	7.25 to 7.75
Boiler punchings	10.50 to 11.00
No. 1 cast scrap	10.50 to 11.00
Stove plate and light cast scrap	9.50 to 10.00
Railroad malleable	10.25 to 10.75
Agricultural malleable	9.25 to 9.75
Pipes and flues	8.00 to 8.25

Philadelphia

PHILADELPHIA, PA., September 16, 1913.

A good general movement continues in the pig-iron market. Basic has been sold for this year's delivery at fully 25c. above recent selling prices and No. 2 X foundry is more closely averaging $16 delivered. Higher asking prices are more general. A number of furnaces are well sold up for this year's delivery and are not aggressive forward sellers. These conditions impart considerable strength to the market. The finished material markets continue rather spotty. In instances, capacity business still rules, but on large lots recent quotations are more generally shaded. A very heavy tonnage of materials for ship building is before the trade. It is estimated that 25,000 to 30,000 tons of plates alone are involved, but contracts are being placed slowly. Fabricated structural work has not been active. Rolling billets, although in a shade better demand, are weak and $1 concessions would be made on good orders. In old material some grades are showing a little more strength. Prompt furnace coke has been sold at $2.25 at oven.

Iron Ore.—There is an entire absence of demand. Many Eastern furnaces are over supplied by purchases made earlier in the year. Importations at this port for the week ended September 12 include 6125 tons from Newfoundland, 22,309 tons from Sweden, 5200 tons from New Brunswick, 12,300 tons from Cuba and 3750 tons from Africa.

Pig Iron.—There has been little cessation in the recent active movement in nearly all grades of pig iron, although prospective buyers are probably not showing as much haste in getting orders placed, being, as a rule, fairly well covered for immediate needs. Some furnaces are now well sold up for the remainder of the year and have advanced prices materially, which has, in a measure, checked speculative buying. As a rule an advance of 50c. a ton over current prices is named for first quarter or half of 1914. Moderate lot sales continue the feature in the higher foundry grades, with standard brands of eastern Pennsylvania No. 2 X foundry selling at a rather wide range, depending on the condition of sellers' order books. The bulk of the sales are made around $16 delivered, with good transactions at $15.85, $16 and $16.25 and occasional sales at higher figures. The price for standard brands of No. 2 X foundry of $15.75 delivered has practically disappeared as far as Eastern furnaces are concerned, although several producers outside the district have recently sold at that figure for delivery at distant competitive points. Virginia No. 2 X foundry continues to be sold at $13 at furnace, for this year's shipment and several fair sized lots, 500 to 1000 tons, are still before the trade, mostly, however, from buyers outside of this immediate district. The leading Virginia producer now quotes $13.50 at furnace for No. 2 X foundry, $13.25 for No. 2 plain and $13 for other grades, for delivery over the first half of next year. Few other Virginia producers are yet making general quotations for deliveries beyond the year end. A very active demand for low grade iron comes from cast-iron pipe makers in this district. One definite inquiry for 5000 tons, for last quarter shipment, from a Delaware River foundry is before the trade, while another is shopping round extensively and would buy a block of iron at a price. This latter buyer has taken on a number of odd lots of Northern iron recently, paying up to $15 delivered. Recent heavy sales of forge iron have practically cleared this market of low grade iron, and makers now have little to offer. Further sales of rolling-mill forge iron, against recent inquiries, have been closed, the most important being a block of 5000 tons at $14.75 delivered. Standard gray forge is stronger, and it is believed that it would be difficult to do better than $15 delivered on further purchases. A central Pennsylvania steel maker, recently in the market for several thousand tons of basic iron, for delivery during the closing months of the year, bought 2000 tons, paying slightly better than $15.25 delivered. Standard analysis low phosphorus pig iron has been selling in small lots at unchanged prices. The strength of pig-iron prices generally has been fully maintained, and on foundry grades a wider range of prices is quoted, but at the higher levels little business is being done. Prices for current sales of standard brands, delivered in buyers' yards in this district, for shipment over the remainder of the year, range about as follows, with advances of about 50c. a ton named for first quarter or half of 1914 delivery:

Eastern Pennsylvania No. 2 X foundry	$15.85 to $16.25
Eastern Pennsylvania No. 2 plain	15.60 to 16.00
Virginia No. 2 X foundry	15.80 to 16.25
Virginia No. 2 plain	15.75 to 16.00
Gray forge	14.75 to 15.00
Basic	15.25 to 15.50
Standard low phosphorus	23.00 to 23.50

Ferroalloys.—A slightly better demand for small prompt lots of 80 per cent. ferromanganese has come out, but material is less available at concessions, and few sellers have any to offer at $56, seaboard, for early shipment. Practically no business in forward ferromanganese is moving. Ferrosilicon remains quiet. Importations of ferromanganese at this port has last week aggregated 917 tons.

Billets.—While few important sales have been made, more business has been moving in small lots. Specifications have also been better. A sale of 500 tons of slabs is reported. Inquiries are before the trade for several thousand tons of open-hearth rolling billets for delivery later in the year. Eastern mills are operating on about an even basis and look for an improvement in buying. Meanwhile prices continue to weaken, and while $26 delivered is the price for fair-sized business in basic open-hearth rolling billets, $25 could no doubt be done

for large lots. On forging billets prices, on the same basis, range from $30 to $31, Eastern mill, covering ordinary analysis specifications.

Plates.—Business has been somewhat irregular. One Eastern mill continues to take capacity business, mostly in small and moderate sized lots, nearly all the sales being made at the 1.60c. delivered here basis. This mill reports the aggregate tonnage for the second week in September as being better than the first week. On business involving any quantity of plates 1.55c. delivered here can readily be done and some mills make this quotations on small orders. Shipyards are the best prospective field for early large lot buying; a number of good inquiries have been figured on but orders develop slowly.

Structural Material.—About an even volume of business is moving in plain structural shapes, but orders are small and of a hand-to-mouth character. In instances sales so far this month have been materially better than during the same period in August. Irwin & Leighton are understood to have the contract for the Ford Motor Company building, covering some 3600 tons of shapes; Bethlehem shapes are largely specified. Several small bridge contracts have been let, but the tonnage is not large. New plans are under way for the proposed South Penn Square building, the structural material requirements for which will, it is estimated, be cut in half. The general range of quotations for plain shapes, delivered in this district, is 1.55c. to 1.60c.

Sheets.—Some Western mills have made price concessions, but Eastern mills continue to take a very fair volume of small orders for early delivery at the recently quoted basis. Mill activities continue at full capacity, and deliveries with some are harder. Western No. 10 guage blue annealed sheets are quoted at a range of 1.75c. to 1.80c., delivered here, but Eastern mills making smooth, loose-rolled sheets still obtain 1.80c. and occasionally 1.90c. for prompt shipment.

Bars.—The demand for ordinary iron bars has been lighter and some of the small mills making common iron bars have made quotations down to 1.32½c., delivered here; but the majority of mills hold to a minimum of 1.35c. and some ask up to 1.42½c. All depends on the grade of the bar and the desirability of the order. Current business in steel bars is moving slowly at 1.55c., delivered in this vicinity.

Coke.—The supply of prompt furnace coke has apparently been increasing. This grade is being offered more freely and makers appear willing to make concessions to move it. Several 2000-ton lots for early delivery have been sold at $2.25 and $2.35 at oven, while smaller lots of spot coke were sold at $2.25. Contract furnace coke is still held at $2.50, but no business has been done. Moderate sales of foundry coke are reported at unchanged prices. For delivery in buyers' yards in this vicinity prices range about as follows per net ton:

Connellsville furnace coke	$4.25 to $4.65
Connellsville foundry coke	4.90 to 5.35
Mountain furnace coke	4.00 to 4.25
Mountain foundry coke	4.50 to 4.75

Old Material.—More activity has developed in a few grades, but the market on the whole is still quiet. One Eastern steel mill has been a heavier buyer of No. 1 heavy melting steel, being reported to have taken an aggregate of 10,000 to 15,000 tons during the past two weeks at prices ranging from $11.75 to $12, delivered. Another Eastern steel mill has been a heavy buyer of borings at $8.25, delivered. More interest is being shown in rolling-mill grades of scrap, and there are several inquiries for old carwheels. Under the circumstances the market has a trifle better appearance. Quotations, however, are still irregular and to a certain extent nominal. An approximate range for delivery in buyers' yards in this district, covering eastern Pennsylvania, taking freight rates varying from 35c. to $1.35 per gross ton, is as follows:

No. 1 heavy melting steel	$11.75 to $12.00
Old steel rails, rerolling (nominal)	14.00 to 14.50
Low phosphorus heavy melting steel scrap	15.50 to 16.00
Old steel axles	18.00 to 18.50
Old iron axles (nominal)	25.00
Old iron rails	17.50 to 18.00
Old carwheels	13.00 to 13.50
No. 1 railroad wrought	14.75 to 15.25
Wrought-iron pipe	11.00 to 11.50
No. 1 forge fire	10.00 to 10.25
No. 2 light iron (nominal)	6.00
No. 2 cut busheling (nominal)	8.00 to 8.25
Wrought turnings	8.00 to 8.50
Cast borings	8.25 to 8.50
Machinery cast	12.75 to 13.25
Grate bars, railroad	9.50 to 10.00
Stove plate	9.50 to 10.00
Railroad malleable (nominal)	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, September 17, 1913.—(*By Telegraph.*)

Pig Iron.—There has been a gradual strengthening of Southern foundry-iron prices. A number of furnaces have fixed their minimum quotation on No. 2 foundry at $11.50, Birmingham, for any shipment this year. It is still possible to scale this price 50c. a ton for prompt shipment, but the choice of irons available at $11 is limited. There are somewhat conflicting reports as to first and second quarter prices. While leading interests are quoting around $12 for shipment over the first half of next year it is possible to contract below this, and for strictly first quarter business $11.25 could be done at the present time. There has not been much buying of foundry iron for next year's requirements as far as foundries are concerned, although a few stove makers have covered for a supply to last through the next six months. A fair-sized basic order is expected to be placed by a nearby mill within the next two weeks, but no details as to the quantity wanted are yet available. Northern foundry iron is unchanged at $14, Ironton, for any shipment this year, and at $14.50 for first half movement. Order books show only small sales made in this territory within the past week. Inquiries are scarce, and as a general rule buyers are not disposed to advertise their wants, preferring to feel out the market through a few individual firms. The largest general inquiry before the trade is one that was noted two weeks ago calling for 2500 tons of foundry iron, equally divided between Northern and Southern grades, all for shipment during the first half. This contract is expected to be closed this week. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote f.o.b. Cincinnati as follows:

Southern coke, No. 1 foundry and 1 soft	$14.75 to $15.25
Southern coke, No. 2 foundry and 2 soft	14.25 to 14.75
Southern coke, No. 3 foundry	13.75 to 14.25
Southern, No. 4 foundry	13.25 to 13.50
Southern gray forge	12.75 to 13.25
Ohio silvery, 8 per cent. silicon	18.20 to 18.70
Southern Ohio coke, No. 1	16.20 to 16.70
Southern Ohio coke, No. 2	15.20 to 15.70
Southern Ohio coke, No. 3	14.95 to 15.45
Southern Ohio malleable Bessemer	15.20 to 15.45
Basic, Northern	15.20 to 15.45
Lake Superior charcoal	16.25 to 17.25
Standard Southern carwheel	27.25 to 27.75

(By Mail)

Coke.—Although some furnace coke has been sold in the Connellsville district as low as $2.25 per net ton at oven for prompt shipment local dealers claim that this price is not available on standard brands. We continue to quote $2.50 per net ton on Connellsville 48-hr. coke and from $2.90 to $3 on 72-hr. There is a scarcity of cars in which to ship coke, and this may have had some effect in the weakening of foundry grades in the district mentioned. However, curtailment of production is under way, and no serious break in prices is looked for. Producers in both the Wise County and Pocahontas fields are moving into a more independent position, and while we quote 48-hr. coke around $2.50 to $2.75 many operators are refusing business at the first named figure, preferring to sell their output of coal. The difference in the price of foundry coke in these two districts is not marked, and it is stated that a few small lots have been disposed as low as $2.75 per net ton at oven, but only for immediate shipment. The contract price is approximately the same as given for Connellsville foundry grades.

Finished Material.—Pittsburgh mills can no longer claim to dominate this market as far as iron bars are concerned, as Chicago producers have lately been selling considerable tonnages in this territory. Fort Wayne mills also figure as factors in supplying the local demand. The mill price on iron bars is from 1.50c. to 1.60c., f.o.b. Cincinnati, and the retail warehouse quotation is around 1.95c. Steel bars are firm at 1.40c., Pittsburgh, for forward shipment, but not much business is being transacted, except to fill immediate requirements. The local sheet mill anticipates an increasing demand for sheets later in the fall, although business now coming in is fairly satisfactory. Structural shapes are quiet, with beams and channels quoted around 1.40c. to 1.45c., Pittsburgh.

Old Material.—Prices are no firmer, nor is business any better, but in some circles there is a slightly better feeling as to the future. However, there is nothing tangible on which to base hope for any advance in quotations as long as pig iron is as low as at present. The minimum prices given below represent what buyers are willing to pay for delivery in their yards, southern Ohio

and Cincinnati, and the maximum quotations are dealers' prices, f.o.b. at yards:

Per Gross Ton.

Bundled sheet scrap	$7.25 to	$7.75
Old iron rails	12.25 to	12.75
Relaying rails, 50 lb. and up	19.75 to	20.25
Rerolling steel rails	11.25 to	11.75
Melting steel rails	9.50 to	10.00
Old carwheels	11.00 to	11.50

Per Net Ton.

No. 1 railroad wrought	$9.25 to	$9.75
Cast borings	4.75 to	5.25
Steel turnings	4.75 to	5.25
No. 1 cast scrap	9.00 to	9.50
Burnt scrap	6.50 to	7.00
Old iron axles	16.75 to	17.25
Locomotive tires (smooth inside)	10.25 to	10.75
Pipes and flues	6.00 to	6.25
Malleable and steel scrap	7.50 to	8.00
Railroad tank and sheet scrap	4.75 to	5.25

The Domhoff & Joyce Company, Cincinnati, Ohio, has been appointed exclusive selling agent for the Roane Iron Company's Rockwood foundry pig iron, made at Rockwood, Tenn., for the St. Louis territory. This company now has the exclusive sale of Rockwood iron in all territory west of the Allegheny mountains. Its head offices are in Cincinnati, with branches in Chicago, St. Louis, Indianapolis and Cleveland.

Cleveland

CLEVELAND, OHIO, September 16, 1913.

Iron Ore.—Some of the furnacemen are already beginning to think about next year's ore prices and feel quite confident that there will be a reduction from the present prices, which are from 55c. to 65c. higher than a year ago. This has been a year of high priced ore and low priced pig iron. Some of the shippers expect that unless there is an improvement in conditions in the steel industry and particularly an advance in pig iron prices, ore prices will have to be reduced next year, but they hope to be able to keep the 1914 prices above the 1912 basis. Late last year, because of the expected advance in prices some furnace companies bought more ore than they expected to need before the opening of navigation this year. However, with the situation as it is at present furnaces will be careful not to make additional purchases late this season unless they find that they will actually need the ore before they can receive some of the next season's shipments. We quote prices as follows: Old range Bessemer, $4.40; Mesaba Bessemer, $4.15; old range non-Bessemer, $3.60; Mesaba non-Bessemer, $3.40.

Pig Iron.—The market is quiet. Several feelers for prices on foundry iron for the first half that have come out during the past two or three weeks have demonstrated fairly well that there is not likely to be any buying movement for that delivery for some time. Very few producers are willing to quote prices for delivery beyond the first of the year, and consumers are unwilling to pay the advance of 25c. to 50c. a ton that is asked by furnaces that have made quotations. It is stated that the Massillon Iron & Steel Co.'s inquiry for 7500 tons for the first half brought only one Northern quotation, that being $14 for No. 3. New inquiries are limited to small lots for the last quarter delivery. Southern iron is firmer. A leading producer has advanced its prices 50c. a ton and is now quoting No. 2 at $11.50 Birmingham for the remainder of the year and $12 for the first half. However, some Southern iron is still to be had at $11 for No. 2 for the last quarter. Most Southern producers are declining to quote prices for the first half. Makers of Ohio silvery iron have advanced prices 50c. to $1 a ton for the first half and are now quoting 8 per cent. silicon at $18 furnace for that delivery. The price of Northern No. 2 foundry is unchanged at $14 Cleveland and Valley furnace for delivery during the remainder of the year. For prompt shipment and for the last quarter we quote, delivered Cleveland, as follows:

Bessemer	$16.65
Basic	15.00
Northern No. 2 foundry	$14.50 to 15.00
Southern No. 2 foundry	15.35 to 15.85
Gray forge	14.25
Jackson County silvery, 8 per cent. silicon	18.55 to 19.05

Coke.—Two local interests have bought standard furnace coke for prompt shipment at $2.25 per net ton at oven and another Cleveland consumer has purchased some prompt shipment fuel at $2.35. Other producers are still adhering to the $2.50 price. Foundry coke is inactive, but firm. Shipments are being delayed because of a scarcity of box cars. Standard Connellsville coke is generally quoted at $3 per net ton at oven for prompt shipment and contract. However, $3.20 is being asked for some makes.

Finished Iron and Steel.—The demand in finished lines shows some improvement. There is a fair volume of inquiries for plates and structural material for specific work, one of these being for 1500 tons and another for 1000 tons. Efforts of buyers to secure lower prices are very persistent and the feeling is more general that present prices will not hold. However, what are called regular prices on structural material and steel bars appear to be maintained in this market, and the larger mills have been asking 1.45c. on plates. Several sales of plates, shapes and bars in lots up to 500 for specific work are reported. John Gill & Sons, Cleveland, were the low bidders for the general contract for the Lincoln Memorial in Washington, D. C., which will require 3000 tons of sheet steel piling. The contract for the Lake Shore shops at Air Line Junction near Toledo, requiring about 1200 tons of structural steel, has been awarded to the McClintic-Marshall Construction Company. A new lake boat to be built by the Great Lakes Engineering Works, Detroit, Mich., calls for 3000 tons of steel. The Cleveland Railway Company has an inquiry out for about 900 tons of steel for new shop buildings. Prices on black sheets have been further shaded to 2.10c., Pittsburgh, for No. 28. Black sheets are quoted at 3.15c. to 3.20c. for No. 28 and blue annealed at 1.60c. to 1.65c. for No. 10. Keen competition for business has resulted in considerable shading of minimum domestic sheet prices for shipment to Canada. The rivet market continues irregular. Bar iron prices are unchanged at 1.40c. to 1.45c., Cleveland. Warehouse prices remain at 2c. for steel bars and 2.10c. for plates and structural material.

Cast Iron Pipe.—The city of Cleveland has awarded to the United States Cast Iron Pipe & Foundry Company an order for 3000 tons of from 3-in. to 48-in. cast iron pipe. This company made the low bid, which was $24.50 per ton, delivered on the streets.

Old Material.—The market is almost lifeless and the outlook is not promising. The local rolling mills are filled up with busheling scrap and are all out of the market. One steel making plant is neither buying scrap nor taking shipments and another is offering lower prices for heavy steel scrap than it has for several weeks. Some heavy melting steel was bought by dealers Monday at $11 for shipment to a Cleveland mill. Quotations are unchanged, but the market is weak and dealers have to shade quotations to make forced sales. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton.

Old steel rails, rerolling	$13.00 to	$13.50
Old iron rails		14.00
Steel car axles	17.00 to	17.50
Heavy melting steel	11.25 to	11.50
Old carwheels	12.50 to	13.00
Relaying rails, 50 lb. and over	23.00 to	25.00
Agricultural malleable	10.00 to	10.50
Railroad malleable	11.00 to	11.50
Light bundled sheet scrap	8.00 to	8.50

Per Net Ton.

Iron car axles	$20.00 to	$21.00
Cast borings	5.75 to	6.00
Iron and steel turnings and drillings	4.50 to	4.75
Steel axle turnings	7.00 to	7.50
No. 1 busheling	10.25 to	10.50
No. 1 railroad wrought	10.50 to	11.00
No. 1 cast	11.00 to	11.50
Stove plate	8.50 to	8.75
Bundled tin scrap	10.00 to	10.50

Germany Feeling Overproduction

New Plate and Bar Mills Pressing for Business—Pig Iron to Be Reduced

BERLIN, September 4, 1913.

Although iron men are encouraged by the better reports from the United States and Belgium, there are no indications of a change for the better in Germany. Buying continues remarkably light, notwithstanding the heavy price reductions of the past few months. The general price situation, however, appears to have been somewhat steadier for a week, but the downward tendency of plates is not yet checked. This week it is reported that shipments from the Essen region to points on the sea coast are now made at as low as 105 marks ($25).

It is regarded now as highly probable that the new list prices for pig iron for 1914, which will be adopted about the end of the month, will show a reduction. Next week the Coal Syndicate is to discuss a reduction of coke and coking coal on October 1 of one mark (0.238) per ton. It is generally expected that the reduction will be made, and in that case it is also believed that pig

iron will be reduced. There is little buying of pig iron, as arrangements for the rest of the half-year were made some time ago. Scrap continues weak under heavy offerings of material.

Business in semi-manufacturing products is growing lighter. The makers of open-hearth steel have begun to offer concessions, and this competition is felt by the Steel Workers' Union, its shipments falling off. Beams are quiet, but steel rails continue in the strong position previously described.

The Steel-Bar Outlook

The recovery in steel bars, which set in several weeks ago, has made no further progress, and the outlook for an improvement is not regarded as being good. The rate of production, now that Thyssen's large plant at Hagendingen (Lorraine) is running at its full capacity, is too great to admit of an improvement in prices. It is rather expected that prices will fall again, instead of rising. The mills are still pretty well supplied with orders, and so there is no pressing or immediate need to cut prices further; but it is doubted whether present prices can be maintained later on when the mills are exerting themselves to obtain new orders. There is great dullness in iron bars. These are feeling the competition of steel bars owing to the heavy reduction in the price of the latter within a half-year.

There has been considerable buying of bands the past few weeks, and the mills now have a pretty good supply of orders in hand. It is even reported that some of them have suspended taking orders at the present prices, which are unremunerative for most of them. Considerable foreign business also continues to come in, but this is also at losing prices. There is sharp competition in cold-rolled bands since the dissolution of the trade organization at the end of June. It is reported that prices are now lower than they were before the organization was formed. Dealers and consumers are taking advantage of the existing prices to buy in pretty large volume.

Still Lower Plate Prices Expected

The plate trade is in bad shape. The new mills that recently began operations are competing sharply for business, and the downward course of prices will probably continue. The Gelsenkirchen Company has increased the production of plates at its Aix-la-Chapelle plant 9000 tons a month; and that is only one of the recent increases. In consequence of the glutted condition of the market, some of the mills have begun to run on short time. This is reported to be the case with a number of the smaller mills in the Siegerland region; but some of the large companies are also not able to keep their plate rolls running full.

Gas and boiler tubes are still in poor position, apparently even worse than hitherto. Prices are lower. Employment on wire rods is still pretty good, owing largely to considerable foreign orders taken at the existing low export prices. Wire mills continue to compete sharply with each other.

The Belgian market continues to show a somewhat better tone. Several days ago the export price of plates was raised 1s. to 2s. at Antwerp. The following are the new prices: Thin plates, 115s. to 117s. ($27.98 to $28.47); medium grades, 110s. to 112s. ($26.76 to $27.25); heavy, 107s. to 108s. ($26.03 to $26.28).

St. Louis

ST. LOUIS, MO., September 15, 1913.

In finished lines there has been something of an increase in business, with no softening of prices, while pig iron has firmed up somewhat. Scrap continues the only unsatisfactory element.

Pig Iron.—The chief feature has been the complete disappearance of $11 Southern iron. First quarter and first half figures are strongly held up to $11.25 and $11.50, respectively, with no strong disposition to take very much at these figures. Consumers are making purchases promptly. Transactions generally were for small lots for immediate delivery. The larger sales included one of 900 tons of No. 2 Southern and one of 600 tons with several of 100-ton to 300-ton size. An inquiry for 2000 tons of Northern basic also appeared late in the week. Ohio and Chicago pig remain at last quotations, but are decidedly firmer than they were. General foundries report good orders ahead. In some instances it has been noted that buyers finding no 1914 iron on the market and feeling that higher prices were coming have doubled their last quarter orders, preferring to pay carrying charges to running the chance of an increase in price.

Finished Iron and Steel.—The fabricating shops are keeping busy with prospects in the architects' offices, chiefly of medium and small work, to keep them free from anticipation of early slackening. Reinforcing material remains in good request and there are some contracts being figured on that will run into reasonable tonnages. Light rails and track fastenings are in only fair request. Plates are quiet and ordinary bars are moving only in fair quantities. Specifications on contracts generally are keeping up and even showing a little increase, with a maintenance of the insistence on prompt shipment.

Coke.—Prices are maintained in coke, with the exception of furnace coke which has receded to $2.25 at oven for the best 48-hr. for both prompt and future shipment. By-product coke is on a parity with Connellsville. Shipments into this section are coming forward in better shape, car troubles having been relieved in some respects.

Old Material.—The scrap market has been rather quiet, but the prices have shown a stronger tendency than was apparent at the last report. The steel mills and foundries operating locally have been taking more material. Relaying rails are still hard to get and the price quoted is stiffly held. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.

Old iron rails	$12.00 to $12.50
Old steel rails, rerolling	11.00 to 11.50
Old steel rails, less than 3 feet	10.00 to 10.50
Relaying rails, standard section, subject to inspection	23.50 to 24.50
Old carwheels	11.25 to 11.75
Heavy melting steel scrap	9.50 to 10.00
Shoveling steel	9.00 to 9.50
Frogs, switches and guards cut apart	9.50 to 10.00

Per Net Ton.

Iron fish plates	$11.00 to $11.50
Iron car axles	19.00 to 19.50
Steel car axles	14.50 to 15.00
Wrought arch bars and transoms	13.50 to 14.00
No. 1 railroad wrought	10.00 to 10.50
No. 2 railroad wrought	9.50 to 10.00
Railroad springs	9.00 to 9.50
Steel couplers and knuckles	9.50 to 10.00
Locomotive tires, smooth	10.50 to 11.00
No. 1 dealers' forge	10.00 to 10.50
Mixed borings	4.00 to 4.50
No. 1 busheling	8.50 to 9.00
No. 1 boilers, cut to sheets and rings	6.00 to 6.50
No. 1 cast scrap	10.00 to 10.50
Stove plate and light cast scrap	7.50 to 8.00
Railroad malleable	8.50 to 9.00
Agricultural malleable	7.00 to 7.50
Pipes and flues	6.75 to 7.25
Railroad sheet and tank scrap	6.00 to 6.50
Railroad grate bars	7.00 to 7.50
Machine shop turnings	5.00 to 5.50
Bundled sheet scrap	5.00 to 5.50

Birmingham

BIRMINGHAM, ALA., September 15, 1913.

Pig Iron.—While the leading interest continues to quote $11 on what foundry iron it has to sell, this quotation does not necessarily mean the general market, as it has but two stacks on foundry. On the other hand, one company announces that it has disposed of its output for the remainder of the year, with some recent sales of small lots on the $11.50 basis. This price is its minimum for such business as it might be able to book for the rest of 1913. Instructions not to open books for 1914 are reported positive. The Sloss-Sheffield Company is still the leading seller, having sold 23,000 tons additional during the second week in September and this month's sales up to September 12 inclusive amounting to 46,000 tons. The total sales of this company since July 4 have been 116,000 tons, which is almost five months' make of its three active stacks, and its accumulations are less than 60,000 tons. Stocks on hand in Alabama, all told, amount to 150,000 tons, a decrease of 50,000 tons from the recent maximum. The Sloss-Sheffield Company does not admit of any sales into 1914 except as a small portion of last quarter bookings. A level of $11.50 is reported for the second week's sales. The same price is reported as having been obtained by another furnace interest and by a leading firm of brokers. Altogether, something like 30,000 tons must have been sold during the second week. None of the furnace operators outside of the Woodward announce any prospective increase in output. A third Republic stack will go in this month or next, but it is understood that another will in turn go out for repairs. Brokers claim to have been able to obtain small lots at $11.25. Business for 1914 might be booked at $11.50

for first quarter, but it does not appear that any operators are encouraging bookings for next year. Certainly $11 is the minimum, and $11.50 for the bulk of business for the remainder of the year seems almost assured. We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft	$11.50 to $12.00
No. 2 foundry and soft	11.00 to 11.50
No. 3 foundry	10.50 to 11.00
No. 4 foundry	10.25 to 10.75
Gray forge	10.00 to 10.50
Basic	11.00 to 11.50
Charcoal	24.50 to 25.00

Cast-Iron Pipe.—Pipe makers are encouraged in the matter of prices. They report a strong effort to secure stability of the quotations and believe they will succeed on account of the rise in pig iron. Orders are reported as sufficient to keep the plants going, but not to move accumulations. We continue to quote 4-in., $22; 6-in. and upward, $20, f.o.b. plants, per net ton.

Coal and Coke.—A shortage of cars is felt in the coal region and several mines shut down the past week on account of lack of cars. Otherwise, the situation is all that could be desired. There is a demand for the output and prices are satisfactory. Coke is as strong as ever, with the same prices ruling. We quote as follows, per net ton, f.o.b. ovens: Furnace, $3.25 to $3.50; foundry, $3.75 to $4.25.

Old Material.—The market has shown a decided improvement, and the price schedule is reported as being adhered to with a good line of business in light steel and cast. The business is largely of a local character. Dealers are taking on stocks and feel generally that the long dull period is over. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles (light)	$15.00 to $15.50
Old steel axles (light)	15.00 to 15.50
Old iron rails	13.50 to 14.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	10.00 to 10.50
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	8.50 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	10.50 to 11.00
Trim carwheels	10.50 to 11.00
Standard carwheels	12.00 to 12.50
Light cast and stove plate	8.25 to 8.75

Boston

BOSTON, MASS., September 16, 1913.

Old Material.—The dealers and the trade in general are marking time while they await developments. Prices are unchanged. Beyond this nothing is to be said of the situation as seen in New England. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices.

Heavy melting steel	$9.00 to $9.25
Low phosphorus steel	13.75 to 14.75
Old steel axles	13.75 to 14.75
Old iron axles	21.25 to 21.75
Mixed shafting	13.25 to 13.50
No. 1 wrought and soft steel	10.75 to 11.00
Skeleton (bundled)	7.75 to 8.25
Wrought-iron pipe	8.75 to 9.25
Cotton ties (bundled)	8.75 to 9.25
No. 2 light	3.75 to 4.25
Wrought turnings	5.50 to 5.75
Cast borings	5.50 to 5.75
Machinery, cast	11.75 to 12.25
Malleable	10.25 to 10.75
Stove plate	8.00 to 8.50
Grate bars	7.00 to 7.25
Cast-iron carwheels	13.75 to 14.25

San Francisco

SAN FRANCISCO, CAL., September 9, 1913.

The last fortnight has brought some betterment in the consuming demand and merchants express considerable encouragement as to the outlook. This optimism is not sufficient, however, to cause any increase in their own purchases. Current specifications seem to be a little larger, owing to the depletion of stocks in several lines, but nothing beyond a sorting-up movement is expected for some time. Aside from possible price recessions due to tariff and other causes, the local trade looks for shipments through the Panama Canal much earlier than has been generally anticipated, and many consider it unsafe to put in large stocks until the effects of the canal can be discounted. Some further reduction is noted in resale prices.

Bars.—Distributive business in the country is improving a little, and a comparatively large movement from store is expected next month. Mill agents, however, are getting very little either in new orders or specifications, as merchants and the largest consumers are fairly well supplied for nearby requirements, and with the prospect of foreign competition, etc., there is no desire to provide for the distant future. Local mills are still running principally on reinforcing material and keep their output well sold up at steady prices. No exceptionally large business is in sight, but orders up to 100 tons are fairly numerous. The price of soft steel bars, in small lots from store, has been cut to 2.50c., with iron at 2.40c.

Structural Material.—The prospect of new tonnage is somewhat better, with several jobs figuring in various parts of the coast and reports of more work to come up in the fall, though most of the prospects are individually small. Continued pressure to get business is indicated by low figures submitted on several recent inquiries. Figures have just been taken on a six-story building at Los Angeles for the Pacific Telephone & Telegraph Company, requiring about 300 tons, and a small job is up for a park conservatory at Los Angeles. The Pacific Rolling Mill Company has taken the Oakland Y. M. C. A. building, but no award has been made for the Hobart building, 1800 tons. An award is also pending on the Horticultural Building of the Exposition, on which Dyer Bros. were low bidders. Figures are being taken on the Physicians' Building, and plans are being completed for the science museum in Golden Gate Park. Some important Government work is expected shortly, including about 400 tons for seven magazine buildings at Pearl Harbor, T. H.; about 2000 tons for mill and warehouse buildings at the Puget Sound Navy Yard, and lock gates for a canal near Seattle. Plans are out here for a small theater on Broadway near Grant avenue, and an addition is to be built to the Union Square Hotel.

Rails.—The vote in favor of the municipal railroad bonds will give rise to considerable business in grooved rails, but there is no telling when the inquiries will come out. There is a fair movement of light rails from store, but very little is being ordered from the mills. Current business in standard sections is limited almost entirely to small orders.

Sheets.—A somewhat better jobbing movement is noted, especially in corrugated sheets, and considerable activity is expected in the next two months. Merchants' specifications are barely sufficient to keep up assortments, though requirements for this purpose are somewhat larger than last month. A fair tonnage, however, is being taken by manufacturers of riveted pipe and other large consumers.

Plates.—The tonnage taken by the larger manufacturers is keeping up well, tank plates being the principal item, though there is a fair movement in shipbuilding material. The outlook for new tank and penstock business in the fall is encouraging, though inquiries are still rather slow in coming out. Plans are under way for a waterworks project, involving a large pipe line from the San Joaquin River above Antioch to Richmond, Cal. Notwithstanding a reasonably good jobbing movement, merchants are keeping out of the market.

Standard Pipe.—Small consuming trades are buying a little more freely than last month, and this is reflected to some extent in merchants' specifications, but there is no real activity, the tonnage taken by mill agents being unsatisfactory. No further inquiries of importance for waterworks supplies are noted, and oil-field business is quiet, while the call for lap-weld material for irrigation is of little importance.

Cast-Iron Pipe.—The United States Cast Iron Pipe & Foundry Company has taken the Long Beach contract for 600 tons, but nothing else worth mentioning has been closed, both municipal and corporation business being rather quiet in this vicinity. The town of Perris, Cal., takes bids September 12 for a water system requiring a small tonnage. The prospect of other business seems uncertain.

Pig Iron.—The local demand continues light, orders being mostly for single carloads for prompt shipment. Foundry business is hardly as active as it has been; some of the foundries have iron in store and there is a strong sentiment against accumulating supplies. Melters expect to get foreign iron below parity with do-

mestic under the new tariff, and Middlesbrough, which has been in use here for many years, is preferred for general purposes. A cargo just arrived is held in bond by melters, and any further arrivals will probably be so held until the new tariff takes effect. The position to be held by Chinese and Indian iron is still rather uncertain. No. 1 Southern foundry and soft is held as before at $22.50 per gross ton.

Coke.—German Syndicate coke for fall loading is firmly held at quite a sharp advance, being now quoted at $13.50 to $14 per gross ton. Buying is on a rather moderate scale, most consumers having provided for their needs for some time to come. German Syndicate coke ex yard is held at the former figures of $15 to $15.50 per net ton.

Old Material.—The demand for cast scrap, though hardly as strong as it was, is fairly active, and values are firmly held at $18 to $18.50 per net ton. Steel melting scrap is moving well on old contracts, being valued as before at $12 per gross ton. Rerolling rails are quoted at $16.50 to $17 per net ton, and wrought scrap at $13 to $15 per net ton.

British Buyers Lack Confidence

Great Britain Disturbed by Poor Trade Reports from Germany—Consumers Withholding Orders

(By Cable)

LONDON, ENGLAND, September 17, 1913.

The market is featureless, with the outlook certainly no better. Demands from consumers are withheld. Confidence is lacking, being disturbed by poor trade reports from Germany. Stocks of pig iron in Connal's stores are now 180,184 gross tons, against 180,891 tons a week ago. We quote as follows:

Cleveland pig-iron warrants (Tuesday), 54s. 4½d. ($13.25), against 54s. 9d. ($13.32) a week ago.

No. 3 Cleveland pig iron, makers' price f.o.b. Middlesbrough, 55s. ($13.38), against 55s. 6d. ($13.50) a week ago.

Ferromanganese, £10 11s. 9d. ($51.53), f.o.b. shipping port.

Steel sheet bars (Welsh), delivered at works in Swansea Valley, £4 15s. ($23.11).

German sheet bars, f.o.b. Antwerp, 87s. 6d. ($21.29).

German 2-in. billets, f.o.b. Antwerp, 80s. ($19.46).

German basic steel bars, f.o.b. Antwerp, £4 14s. to £4 15s. ($22.87 to $23.11), against £4 16s. to £4 17s. ($23.36 to $23.60) a week ago.

Steel bars, export, f.o.b. Clyde, £6 10s. ($31.63).

Steel joists, 15-in., export f.o.b. Hull or Grimsby, £6 2s. 6d. ($29.81), against £6 5s. ($30.42) a week ago.

German joists, f.o.b. Antwerp, £5 8s. to £5 11s. ($26.28 to $27.01).

Steel ship plates, Scotch, delivered local yards, £7 15s. ($37.72).

Steel black sheets, No. 28, export f.o.b. Liverpool, £9 5s. ($45.02).

Steel rails, export, f.o.b. works port, £6 10s. ($31.63).

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb. f.o.b. Wales, 13s. 1½d. ($3.19).

(By Mail)

Finished Material Weaker and Continental Competition Is Feared—Germany's Heavy Pig-Iron Stocks

LONDON, ENGLAND, September 6, 1913.

The last week or so has witnessed an extension of interest in the warrant iron market, mainly at the hands of a leading firm of dealers whose operations are ordinarily identified most closely with copper. This has led the market at large to take the view that there is nothing in the intrinsic position of pig iron to justify the buying movement, and it has been suggested that the buying of iron was for the purpose of supporting copper. There is, of course, nothing in this, for iron and copper stand upon different bases and the conditions affecting their production bear to-day no relation to each other. There has not yet been any revival of buying on the part of the trade. The sentiment generally is perhaps a little better than it was, being helped in part no doubt by the virtual abandonment of the Cleveland iron masters' proposals for the abolition of the warrant market. The stocks in warrant stores are gradually going down and the total held is admittedly very small, but for all this nobody seems to think there is much to go for on the bull tack. Consumers are quite at a standstill for the time.

Germany Piling Up Pig Iron

Reports from Germany are that pig-iron stocks there are accumulating at a rapid rate, and now reach a very formidable figure—over 1,000,000 tons, so it is said, and it is added that production is a matter of 15 to 20 per cent. in excess of consumption, and that it is not possible to regulate the former because the furnacemen are fully sold in the matter of by-products. This may be an exaggeration but there is certainly a fundamental weakness in the German position which is not shown in the market for semi-finished steel. Here, indeed, the tendency remains firm, and 87s. has been paid for sheet bars free on board Antwerp, while a trifle more than this is now demanded by the German Verband. Meantime the demand is of a sluggish nature, for consumers covered themselves pretty well some weeks ago, and can afford to look on for a bit.

Recent indications in the finished iron and steel trade are rather of a poor character, demand being slow, while prices have had a downward tendency. Within the last few weeks the British Steel Association reduced its prices for sectional material in the effort to induce business, but the result has not been very gratifying. There is no doubt that foreign competition is feared to a great extent, and it is significant that German plates and sheets are very weak, with works able to give delivery in some cases within a week or so. This being the case here, and somewhat similar conditions prevailing for bars, etc., there is little wonder that the tendency of the British merchant is to take a very conservative view of the future. There has been a little more doing with the shipyards lately and a fair number of new contracts have been put on the books which should help the steel makers along, but the general run of the steel works is rather wanting new orders. Just now the rail business looks brighter but prices have eased a little, following hematite iron.

Buffalo

BUFFALO, N. Y., September 16, 1913.

Pig Iron.—The situation continues to strengthen, showing steady improvement both in demand and price. Inquiry is running in larger tonnages—500 to 1000 tons—instead of carloads to 100 tons as was recently the case. The price improvement has been more in sentiment than in actual increase in schedules; but the majority of producers are now holding very firmly for the maximum of the schedule quoted for the week. Melters are insistently calling for deliveries in larger quantities on existing contracts; many are doubling their shipping specifications and furnaces are loaded to capacity with rail and canal rush shipment orders. The aggregate of new placement for the week is about 25,000 tons, largely foundry grades; but including some malleable and a smaller percentage of charcoal. Orders include a good many lots of over 100 tons, running to 500, 600 and 1000 tons, one lot of 1200, one of 3000 and one of 4000 tons, foundry grades, being reported. Almost the entire total of this tonnage is for delivery over the fourth quarter. Furnaces are not disposed to take on business for first quarter or half of next year except at an advance in price, and buyers have not reached the point where they are willing to pay it. Furnaces as a rule are well booked for the fourth quarter production. Stocks of charcoal iron on hand at docks have been heavily reduced during the present season of navigation, and prices are now firmly held. For delivery covering remainder of year we quote as follows:

No. 1 foundry	$14.75 to $15.00
No. 2 X foundry	14.25 to 14.75
No. 2 plain	14.00 to 14.25
No. 3 foundry	14.00
Gray forge	13.75 to 14.00
Malleable	14.50 to 14.75
Basic	14.50 to 14.75
Charcoal, regular brands	15.75 to 16.75
Charcoal, special brands and analysis	17.00 to 20.00

Finished Iron and Steel.—Improved demand is noted in bar material, angle iron, hoops and bands and many other lines of finished products. Considerable bar material has been contracted for for fourth quarter and first quarter of next year, and specifications on existing contracts are coming along in good volume. An order for a large tonnage of reinforcing bars for concrete work on Welland Canal construction is reported. Increased activity is noted in fabricated structural lines with numerous inquiries coming out for medium sized tonnages. Bids are soon to be taken for construction

of the new Moeller Hotel, this city, 400 tons. Bids are to go in this month on the Holyoke Hotel, Holyoke, Mass., from plans of architects Esenwein & Johnson, this city, calling for 700 tons. Bids go in September 22 for public school No. 18, Rochester, taking 200 tons, and bids are being received this week for 1500 tons for viaduct extensions to carry several streets over the new passenger terminal tracks of the Lehigh Valley, Buffalo. The Lackawanna Bridge Company has 2000 tons for the new Canadian plant of the Union Carbide Company, Welland, Ont. The Jones & Laughlin Steel Company has taken 100 tons for the Tonawanda Brewing Company, Tonawanda, N. Y., and the Buffalo Structural Steel Company has 100 tons for a car house for the New York State Railways, Rochester, and 100 tons for the Eastern Tanners Glue Company, Gowanda, N. Y. The C. F. Ernst's Sons Iron Works, Buffalo, has taken 200 tons for the church, school and convent for the Church of the Sacred Heart, Buffalo, and 100 tons for the Magnus Beck Brewing Company, Buffalo.

Old Material.—Transactions have been light in all commodities with the exception of cast iron borings and steel turnings, in which a fair degree of activity, which has been noted for the past two or three weeks, still continues. Dealers appear confident there will be a revival of demand from both foundries and mills in general lines very shortly and are holding stocks in anticipation of increased prices. We quote as follows per gross ton f.o.b. Buffalo:

Heavy melting steel	$10.50 to $11.00
Boiler plate, sheared	12.50 to 13.25
Bundled sheet scrap	8.00 to 8.50
No. 1 busheling scrap	10.50 to 11.00
No. 2 busheling scrap	8.00 to 8.50
Low phosphorus steel scrap	16.50 to 17.00
Iron rails	15.00 to 15.50
No. 1 railroad wrought	13.00 to 13.50
No. 1 railroad and machinery cast scrap	13.00 to 13.50
Steel axles	17.00 to 17.50
Iron axles	22.50 to 23.00
Carwheels	12.50 to 13.00
Railroad malleable	12.00 to 12.50
Locomotive grate bars	10.00 to 10.50
Stove plate (net ton)	9.75 to 10.00
Wrought pipe	9.50 to 10.00
Machine turnings	6.00 to 6.50
Heavy steel axle turnings	8.00 to 8.75
Clean cast borings	6.25 to 6.75
Bundled tin scrap	14.00

New York

NEW YORK, September 17, 1913.

Pig Iron.—It is noticed that pig iron inquiries that have come up recently have been closed rather promptly. This is in contrast with the deliberation buyers showed some weeks ago, even though at that time weekly purchases were running to a larger aggregate than is the case just now. Sellers agree that there is a fairly steady run of business, ranging from 200 tons up to 2000 tons, and there are predictions that this sort of activity will be seen for a few weeks yet, at least. This situation seems to be a natural result of the differences of opinion regarding the future which prevailed among buyers in July and August. As a rule they were conservative, and in some few cases there was dissent from the general view that prices in the latter half of the summer were at low point. The fact that few consumers are covered for a long time ahead will spread a certain amount of business over the next two or three months. The buying of the past week from Buffalo furnaces came in considerable part from Canada, with a good sprinkling of business from New York State, New England doing comparatively little. For delivery in the remainder of the year Buffalo furnaces are selling at $14 to $14.25 for No. 2 X foundry with from 25c. to 50c. added where deliveries run over the first quarter of 1914. While there is no big business for 1914 in what has been recently done, such deliveries are figuring to a larger extent than heretofore. In this vicinity inquiries pending include 1000 tons for a New Jersey buyer and 600 tons for a foundry in Brooklyn. Additional pipe iron sales have been made by eastern Pennsylvania furnaces, and producers there are perhaps slightly firmer in their views, $15 at Lebanon Valley furnace being now commonly quoted, representing a 50c. advance from the low priced business done from that district two weeks ago. Virginia furnaces are quoting from $13 to $13.50 at furnace for No. 2 X iron. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $16 to $16.25; No. 2 X, $15.75 to $16; No. 2 plain, $15.50 to $15.75. Southern iron is quoted at $15.75 to $16.25 for No. 1 foundry and $15.25 to $15.75 for No. 2.

Ferroalloys.—Inquiries in the market amount to 1500 tons, 1000 tons of which is for prompt delivery. Sales and inquiries are a little more active than for some time. The producers' price still remains at $56, Baltimore, with more sales made at this price than recently, though it can be shaded on desirable orders. Quotations for ferrosilicon are still $75, Pittsburgh, for carloads; $74 for 100 tons and $73 for 600 tons and over, the volume of business being normal.

Structural Material.—Quite a number of fair sized awards have been made in the structural field, but new inquiries are yet far from equaling shipments and local fabricators are quite anxious for business, probably not more than two or three having very much work ahead. Fabricating capacity is regarded as much too great for average consumption, and an outlet is suggested through cultivating more export business. Among the new projects may be mentioned 1000 tons for the Puget Sound Navy Yard and 1500 tons for bridge work for the Lehigh Valley in the Buffalo district. The subway work for Seventh avenue, on which bids are to be taken about October 1, will require 6500 tons of material. Fabrication work lately closed includes the following: Approach structure for the Commonwealth Pier, Boston, 1800 tons, to the Boston Bridge Works; three-span highway bridge over the Gunpowder River, Baltimore, 1000 tons, to McClintic-Marshall Construction Company; building for Johns Hopkins University, 540 tons, to Detrich Brothers, who have also 725 tons for a recreation pier, Baltimore; Keith theater, Fifth avenue, Brooklyn, 500 tons, to Harris-Silver-Baker Company, which has taken the theater and office building at Broadway and Eighty-first street, New York; New York Central suburban area work, 700 tons, to Phoenix Bridge Company, which has also 300 tons for the Central Railroad of New Jersey at Phillipsburg, N. J. The Royal Bank Building, Toronto, 2900 tons, has gone to the Dominion Bridge Works. It is expected that the American Bridge Company will be awarded the 3600 tons of the Ford Motor Company's building in Philadelphia. Some 1200 tons for the New York Central, including 260 tons for the Exterior street bridge, is also reported closed. We quote mill shipments of plain material at 1.40c. to 1.45c., Pittsburgh, or 1.56c. to 1.61c., New York, and from store 2.10c. to 2.15c.

Plates.—To a surprising extent the belief prevails that on desirable orders plates are obtainable at 1.35c., Pittsburgh, and one case is learned of 800 tons domestic business being laid on the Atlantic seaboard at 1.35c., base, Pittsburgh. Business consists almost solely of individually small orders, and it is estimated that production is at about 60 per cent. of capacity. Car builders see no immediate prospects of early financing of railroad car purchases, though many railroads are figured as urgently in need of further rolling stock and about the only new business lately closed is 15 passenger cars for the Maine Central. We quote plates at 1.40c., base, Pittsburgh, mill shipments, or 1.56c., New York.

Bars.—A slight betterment in specifications is noted in both steel and iron bars. One large inquiry from the Stone & Webster Corporation is for 1000 tons of reinforcing bars for the Massachusetts Institute of Technology. A recent inquiry for a variety of sizes of bar iron, aggregating 15 to 20 tons, brought a range of prices figuring back to the mill from 1.30c. to over 1.45c. Steel bars are quoted at 1.40c., base, Pittsburgh, from mill, or 1.56c., New York, and 2c. to 2.05c. from store; bar iron is 1.40c. to 1.45c., New York, mill shipments, and 2.05c. to 2.10c. from store.

Cast-Iron Pipe.—Lynn, Mass., opened bids yesterday on 6000 tons of a variety of sizes ranging from 4 to 36 in. The Department of Water Supply, Gas and Electricity of this city opens bids to-day for a pipe-laying contract for Brooklyn, which will involve the purchase of about 2000 tons of 12 to 20 in. pipe. No developments of importance have occurred in the general demand, which remains quiet. Carload lots of 6-in. are quoted at about $23 per net ton, tidewater, New York.

Old Material.—Cast scrap is a trifle higher in sympathy with the recent advances in the price of pig iron. Foundries, however, continue to buy but sparingly. Some few specialties, such as selected cast borings, have been in better demand, but wrought scrap is not active. Steel companies generally manifest no eagerness to take steel scrap, but one eastern Pennsylvania company has been a good buyer. The quiet condition of the trade is shown by the fact that some of the largest dealers report their total sales for the past week in

hundreds of tons instead of thousands. Dealers' quotations are as follows, per gross ton, New York:

Old girder and T rails for melting	$9.25 to $9.75
Heavy melting steel scrap	9.25 to 9.75
Relaying rails	21.50 to 22.00
Rerolling rails	12.50 to 13.00
Iron car axles	21.00 to 21.50
Steel car axles	15.75 to 16.25
No. 1 railroad wrought	12.50 to 13.00
Wrought-iron track scrap	11.00 to 11.50
No. 1 yard wrought, long	10.50 to 11.00
No. 1 yard wrought, short	10.00 to 10.50
Light iron	3.50 to 4.00
Cast borings	5.50 to 6.00
Wrought turnings	5.00 to 5.50
Wrought pipe	9.00 to 9.25
Carwheels	12.00 to 12.50
No. 1 heavy cast, broken up	11.00 to 11.50
Stove plate	8.50 to 9.00
Locomotive grate bars	7.50 to 8.00
Malleable cast	9.00 to 9.50

Metal Market

NEW YORK, September 17, 1913.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead		Spelter	
Sept.	Lake.	Electrolytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
11	16.87½	16.62½	42.37½	4.75	4.62½	5.90	5.75
12	16.87½	16.62½	42.35	4.75	4.62½	5.90	5.75
13	16.87½	16.62½	.....	4.75	4.62½	5.90	5.75
15	16.87½	16.62½	42.87½	4.75	4.62½	5.90	5.75
16	16.87½	16.75	42.75	4.75	4.62½	5.80	5.65
17	16.87½	16.75	42.60	4.75	4.62½	5.80	5.65

Copper has advanced, despite the absence of business. Tin is easy, with a buying movement looked for momentarily. Lead is dull and prices tend toward a lower level. Spelter is lower and quiet. Antimony continues featureless.

New York

Copper.—Despite the fact that there has been no business worthy of mention, the market advanced yesterday and electrolytic is now quoted at 16.75c., cash New York, or 16.87½c., thirty days, delivered. The advance is ascribed to the strong statistical position of standard abroad which, however, shows some impairment to-day, inasmuch as the London market opened 8s. 9d. lower. A supporting feature of the foreign market has also been a strike on the Rio Tinto Railroad. Some sellers quote 17c. for Lake, but second-hand lots which were offered yesterday did not find takers at 16.87½c. cash. Producers have little to sell. Newspaper dispatches from Calumet, Mich., state that the daily copper rock shipments from the mines in that district, operating under strike conditions, are only a little more than one-eighth of the normal production, but the production is being increased from day to day. The prices of copper in London to-day were £74 13s. 9d. for spot and £74 8s. 9d. for futures. Exports this month total 16,045 tons.

Pig Tin.—Throughout the week there has not been one day of good tin buying. While the market is dull at the moment, better buying is expected to start at almost any time. Consumption is fair and it is felt that actual need will precipitate activity. This belief is furthered by the fact that buyers show some disposition to take hold at each decline of the market. Stocks are not over large and the general position of the metal is regarded as good from the sellers' point of view. The Minnewaska, which arrived last Monday, is now discharging her cargo of 720 tons, most of which is being shipped direct to consumers. The quotation in New York this morning was 42.60c., with a strong probability that a lower level might be reached during the day. Quotations in London to-day were £193 15c. for spot and £193 for futures. Arrivals this month total 2003 tons and there is afloat 3215 tons.

Old Metals.—The market is strong and demand good. Dealers' selling prices are firm but unchanged as follows:

	Cents per lb.
Copper, heavy and crucible	15.75 to 16.25
Copper, heavy and wire	15.25 to 15.50
Copper, light and bottoms	13.75 to 14.25
Brass, heavy	10.25 to 10.75
Brass, light	8.75 to 9.00
Heavy machine composition	14.00 to 14.25
Clean brass turnings	9.50 to 9.75
Composition turnings	12.00 to 12.50
Lead, heavy	4.50
Lead, tea	4.25
Zinc scrap	4.50

Lead.—The market is dull and easier. Sales have been made at 4.75c., New York, and at 4.62½c., St. Louis. It is highly probable that 4.60c., St. Louis, would not be refused, although no business could be done at less than that figure. One reason for the easier tone is that one big producer, which took advantage in the recent strike of a cancellation clause in its contracts has resumed shipping. The feeling is general that lower prices are not far off.

Spelter.—The continued lack of business has lead to a reduction in prices and 5.80c. to 5.85c., New York, and 5.65c. to 5.70c., St. Louis, are now quoted. What business there is is mostly in the cheaper grades.

Antimony.—The dormant condition of this metal continues. The only feature is the one so frequently referred to,—the large amount of metal in bonded warehouses which will be released when the new tariff becomes effective. Prices are unchanged at 7.75c. to 8c. for Hallett's, 8.35c. to 8.40c. for Cookson's and 7.37½c. to 7.62½c. for Chinese and Hungarian grades.

Chicago

SEPTEMBER 15.—Conditions in the local metal market have shown little change. We quote as follows: Casting copper, 16.75c.; Lake, 17c. to 17.25c., for prompt shipment; small lots, ¼c. to ⅛c. higher; pig tin, carloads, 43½c.; small lots, 45½c.; lead, desilverized, 4.70c. to 4.75c.; corroding, 4.95c. to 5c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.85c.; Cookson's antimony, 10.50c., and other grades, 9.75c., in small lots; sheet zinc, $8, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 14c.; copper bottoms, 12.75c.; copper clips, 13.25c.; red brass, 12.75c.; yellow brass, 9.50c.; lead pipe, 4.12½c.; zinc, 4.25c.; pewter, No. 1, 26c.; tinfoil, 32.50c.; block tin pipe, 36c.

St. Louis

SEPTEMBER 15.—Lead has shown an easier tendency, closing at 4.65c. Spelter has been firm, closing at 5.75c. at the close to-day. Lake copper is quoted at 17.22½c. to 17.35c.; electrolytic, 17.10c. to 17.22½c.; tin, 43.10c. to 43.35c.; Cookson's antimony, 8.65c. to 8.75c. In the Joplin market the strength of ore was maintained and production has begun to show an increase. The past week the price was from $46 to $48 per ton for 60 per cent., with choicest grades $51. Calamine brought $21 to $22 for 40 per cent., running up to $27. Lead ore was steady at $58 for 80 per cent. On miscellaneous scrap metals we quote as follows: Light brass, 5.50c.; heavy brass and light copper, 10c.; heavy copper and copper wire, 11.50c.; zinc, 2.75c.; lead, 3c.; pewter, 24c.; tinfoil, 30c.; tea lead, 2.75c.

Iron and Industrial Stocks

NEW YORK, September 17, 1913.

The past week has been characterized by a spurt of activity in the stock market, accompanied by a general rise in prices. The stimulus to the market was given by the generally accepted report that the Union Pacific Railroad would make a substantial disbursement to its stockholders from the proceeds of the sale of its holdings of Southern Pacific Railroad stock. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Am. Can, com.	34⅛ - 38¾	Nat. En. & St., pref.	82 - 84¼
Am. Can, pref.	96 - 99½	Pressed Steel, com.	28 - 29⅛
Am. Car & Fdy., com.	47⅛ - 48	Pressed Steel, pref.	97 -100
Am. Car & Fdy., pref.	115⅛	Railway Spring, com.	27 - 27⅞
Am. Loco., com.	35¼ - 36½	Railway Spring, pref.	96¾ - 97
Am. Loco., pref.	105	Republic, com.	23⅜ - 25
Am. Steel Foundries	31 - 31¼	Republic, pref.	89 - 92½
Bald. Loco., com.	45½ - 45¾	Rumely Co., com.	21 - 23
Bald. Loco., pref.	104 -105½	Rumely Co., pref.	51¾ - 54⅞
Beth. Steel, com.	35¾ - 37⅛	Sloss, com.	30½ - 36¼
Beth. Steel, pref.	72¾ - 74	Sloss, pref.	92
Case (J. I.), pref.	97½ - 97¾	U. S. Steel, com.	63 - 66¼
Colorado Fuel	31¼ - 34½	U. S. Steel, pref.	108¾-109¾
Deere & Co., pref.	96½ - 97	Va. I. C. & Coke	42 - 46
General Electric	142½-149	Westinghouse Elec.	71½ - 74
Gr. N. Ore Cert.	34¾ - 37¾	Am. Ship, com.	40⅛
Int. Harv., com.	109 -111½	Chic. Pneu. Tool	52 - 55½
Int. Harv., pref.	116	Cambria Steel	46 - 48¾
Int. Harv., Corp.	108 -110½	Lake Sup. Corp.	26 - 27
Int. Harv., Corp., pref.	114½	Crucible Steel, com.	16¾ - 16¾
Int. Pump, com.	6¾ - 7	Crucible Steel, pref.	93¾ - 93½
Int. Pump, pref.	23¼ - 23½	La Belle Iron, com.	47
Nat. En. & St., com.	14 - 14¾		

Dividends Declared

The J. I. Case Threshing Machine Company, regular quarterly, 1¾ per cent. on the preferred stock, payable October 1.

The American Brake Shoe & Foundry Company, regular quarterly, 2 per cent. on the preferred and 1¾ per cent. on the common stock, payable September 30.

The International Harvester Company of New Jersey, regular quarterly, 1¾ per cent. on the common stock, payable October 15.

The International Harvester Corporation, regular quarterly, 1¾ per cent. on the common stock, payable October 15.

The Otis Elevator Company, regular quarterly, 1 per cent. on the common and 1½ per cent. on the preferred stock, payable October 15.

The American Locomotive Company, regular quarterly, 1¾ per cent. on the preferred stock, payable October 21.

The Union Switch & Signal Company, 1½ per cent. on both the common and preferred stock, payable October 10.

The American Iron & Steel Mfg. Company, regular quarterly, 1¾ per cent. on the preferred and 1¼ per cent. on the common stock, payable October 1.

The Westinghouse Air Brake Company, regular quarterly, 2 per cent. and an extra dividend of 2 per cent., the same as three months ago, payable October 15.

The Sloss Sheffield Steel & Iron Company, regular quarterly, 1¾ per cent. on the preferred stock, payable October 1.

The Taylor-Wharton Iron & Steel Company, regular quarterly, 1½ per cent. on the preferred stock, payable November 1, and 4 per cent. on the common stock, payable October 1. This is the second common stock dividend since the first of the year, the previous dividend being 3 per cent.

The Dominion Steel Corporation, Ltd., regular quarterly, 1 per cent. on the common stock, payable October 1.

The American Seeding Machine Company, regular quarterly, 1 per cent. on the common and 1½ per cent. on the preferred stock, payable October 15.

Manning, Maxwell & Moore, Inc., regular quarterly, 1½ per cent., payable September 30.

The Long-Looked-For Industrial Commission

The Senate on September 10 confirmed the nominations of the Commission on Industrial Relations, which were sent in by President Wilson several weeks ago, but which were held up in the Committee on Education and Labor by a member of that committee who was not pleased with the personnel of the commission because it did not contain the name of a representative of agriculture. The commission as confirmed consists as follows: Frank P. Walsh, of Missouri, chairman; John R. Commons, of Wisconsin; Mrs. J. Borden Harriman, of New York; Frederic A. Delane, of Illinois; Harris Weinstock, of California; S. Thurston Ballard, of Kentucky; John D. Lemmon, of Illinois; James A. O'Connell, of Washington, D. C., and Austin B. Garrison of Iowa.

The Tariff Bill Conferees

Vice-President Marshall has named the following Senators as members of the conference committee on the tariff bill: Simmons, of North Carolina; Shively, of Indiana; Williams, of Mississippi, and Johnson, of Maine, Democrats. Lodge, of Massachusetts; Penrose, of Pennsylvania, and La Follette, of Wisconsin, Republicans.

Speaker Clark has named the following Representatives to serve on the committee: Underwood, of Alabama; Rainey, of Illinois; Kitchin, of North Carolina, and Dixon, of Indiana, Democrats. Payne, of New York, and Fordney, of Michigan, Republicans. Murdock, of Kansas, Progressive.

The Skinner Chuck Company, New Britain, Conn., recently shipped three planer chucks of unusual size. Their combined weight was 3200 lb., two of them weighing 1250 lb. each and the third 700 lb. The company states that it is not aware of any heavier planer chucks having been made. Large boring mill table chucks and lathe chucks are heavier than these, but not planer chucks.

The Standard Automatic Machine Company, 371 to 381 St. Paul street, Rochester, N. Y. calls attention to the fact that it is building machinery for labeling and banding purposes which is claimed to be the most modern now on the market. This information is given because of a number of inquiries that have recently been received for names of manufacturers of this class of machinery.

The furnace of the Pulaski Iron Co., Pulaski, Va., was blown out September 12 for relining. It is planned to blow the stack in again in 30 days.

Pittsburgh and Vicinity Business Notes

The Wheeling Steel Casting Company, Wheeling, W. Va., manufacturer of high-grade acid steel castings, is making an addition 100 ft. in length to its plant and is installing a new 15-ton alloy steel furnace, which will be ready for operation about October 1. C. H. Dowler is president and general manager and C. B. Collingwood is superintendent.

The Valley Mold & Foundry Company, Sharpsville, Pa., which intends to largely increase its output of ingot molds, is asking bids on the erection of a steel building, 250 ft. long and 40 ft. wide. It is now turning out close to 800 tons of ingot molds and stools per day.

The Joseph Reid Gas Engine Company, Oil City, Pa., is considerably enlarging its capacity. A brick and iron building, 75 x 122 ft., has been completed as a casting, cleaning and storage room. A two-story brick and iron machine shop, 40 x 40 ft., has also been completed. The old blacksmith shop is being rebuilt and an addition erected, making when completed a structure 56 x 102 ft. The necessary equipment has practically been provided for.

It is understood that the Pennsylvania State Hospital for the Insane, Warren, Pa., will have plans prepared at an early date for a new power plant, and that water-tube boilers to develop 1600 hp. will be installed.

The Elm Grove Motor Sales Company, Elm Grove, W. Va., has been incorporated to build a garage. The capital is $10,000 and the incorporators are G. W. Hand, D. N. Walter, John E. Shorts and others.

The Cold Water Timber Company, Huntington, W. Va., has been incorporated to build a plant in Martin County, Ky. The authorized capital is $15,000 and the incorporators are A. B. Hyman, S. J. Hyman, W. H. Cunningham and others.

The Logan Lighting Company, Logan, W. Va., has been incorporated to furnish electric current for light, heat and power; capital, $200,000; incorporators, Gillbank Twig, Russell G. Rankin, Bernard W. Burnside and others, all of Washington, D. C.

The Beans Foundry Company, Martins Ferry, Ohio, which made a new record of output in August, is planning to rebuild its plant and greatly enlarge it. The machinery is run by electric power.

The Sharon Steel Hoop Company, Sharon, Pa., is building an addition to its power house and will add new equipment which will considerably increase its electrical facilities. One new unit is to be installed at once, and place is provided for a second, to be installed later.

It is reported, but not officially confirmed, that the Standard Steel Car Company, Pittsburgh, is getting ready to engage in the manufacture of automobiles at its plant at Butler, Pa.

Hubbard & Co., Pittsburgh, manufacturers of shovels, spades and scoops, have placed a contract for the steel frame work for a new foundry building with the Jones & Laughlin Steel Company.

The regular meeting of the Engineers' Society of Western Pennsylvania will be held in its rooms in the Oliver Building, Pittsburgh, on Tuesday evening, September 30. G. W. Short, general manager of the Sharon Steel Hoop Company, Sharon, Pa., expects to present a paper on "The Use of Pulverized Coal in Heating Furnaces." His company is operating a number of heating furnaces on pulverized coal with good results, and expects to use this fuel for firing its open-hearth furnaces within a short time. The paper will no doubt be of much interest to metallurgical engineers and heating experts, who are giving the subject of heating with pulverized coal a good deal of attention.

The contract for a four-story brick and steel addition to the plant of the Ruud Mfg. Company, Pittsburgh, has been placed with J. A. Craig. The Ruud Company makes hot water heaters, which are in such heavy demand as to require this large increase in the plant.

The Beaver Dam Malleable Iron Company, Beaver Dam, Wis., filed a voluntary petition in bankruptcy September 16. Liabilities are in excess of $500,000 and assets $640,000. The plant will be operated as a going concern under the direction of the receiver, Ernest E. Smythe, Milwaukee.

Personal

Chairman E. H. Gary, of the United States Steel Corporation, arrived in New York on the Imperator Wednesday, September 17.

H. P. Bope, vice-president Carnegie Steel Company, who came to New York this week for a meeting of general sales managers of Steel Corporation companies, had a sudden seizure of appendicitis and was successfully operated on at a New York hospital Tuesday night.

Prof. A. Riebe, director of the Riebe-Kugellager und Werkzeug Fabrik, of Berlin, Germany, will arrive in New York by the Imperator, September 18, for a visit with his American agents, Olin, Biberson & Lowy, 30 Church street. In conjunction with Professor Striebeck, Professor Riebe is responsible for the ball bearing in its present form, and while in America will deliver several illustrated lectures before the various sections of the Society of Automobile Engineers. The lecture before the Metropolitan Section will be given September 25, the subject being "A Review of the Inception of the Ball Bearing and Roller Bearing and Their Application in the Automobile Industry."

Henry C. Frick, who has been abroad about a month, returned to this country September 10.

W. E. Farrell has severed his connection with the Treadwell Engineering Company and has taken offices in the Northampton National Bank Building, Easton, Pa., where he will engage in general consulting and contracting engineering practice.

The Apollo Steel Company, Apollo, Pa., manufacturer of black and galvanized sheets, has appointed John T. AuWerter its representative for the State of Michigan, also Fort Wayne, Ind., Toledo and Cleveland, Ohio, and intermediate points, with offices in the Citizens Building, Cleveland, Ohio.

W. A. Rose, formerly chief engineer for the Oliver Iron Mining Company in the Hibbing district, has been appointed chief mining engineer for Pickands, Mather & Co., with offices at Duluth.

Robert E. Belknap, Chicago, Western sales agent for the Pennsylvania Steel Company, has been chosen vice-president and director of the Evanston Street Railway Company, in the organization of which he took a prominent part.

H. S. Belser, superintendent for the Kansas City Structural Steel Company for the past six years, has been appointed to a similar position with the Chicago Steel Products Company, Chicago.

J. M. Searle, chief of the smoke department of Pittsburgh, was elected president of the International Association for the Prevention of Smoke at its meeting held in Pittsburgh last week. Grand Rapids, Mich., was selected as the city for the annual meeting next year.

George A. Mason, sales manager for the wire department of the Jones & Laughlin Steel Company, Pittsburgh, has returned from a two months' trip to Europe.

Ernest B. Rose has been appointed secretary of the new safety department of the labor bureau of the Republic Iron & Steel Company, Youngstown, Ohio.

James Duane, Jr., superintendent of the Pittsburgh Crucible Steel Company, Midland, Pa., has resigned, to take effect October 1. He has made a remarkable record with one of the largest single blast furnace plants in the country on basic iron. This furnace has begun its eighth year on one lining and bids fair, with judicious management, to run two or three years longer.

Charles Kirchhoff arrived in New York City September 8, after a sojourn in Europe of several months.

Clarence Hayward, office manager of the Domhoff & Joyce Company, Cincinnati, is absent on a vacation tour through northern Michigan and Canada.

Franklin Alter, president American Tool Works Company, Cincinnati, Ohio, has returned from a summer vacation at an Eastern resort.

J. H. Schoenly, for the past 10 years Southern sales manager of the Phoenix Iron Company, with offices in Baltimore, has resigned, effective October 1, to accept the position of vice-president and treasurer of the Roanoke Bridge Company, Roanoke, Va.

J. B. Clark, formerly assistant general superintende of the Shoenberger works of the American Steel & Wi Company, Pittsburgh, has been made general superinten ent of the Donora works of the company, succeeding Bayard, deceased. C. C. Hill, formerly assistant superi tendent of the Shoenberger works, has been made gener superintendent of that plant, succeeding Mr. Clark.

N. Lilienberg, Betz Building, Philadelphia, Pa., ha been appointed sales agent in the United States for th Stora Kopparbergs Bergslag Aktiebolag, Falun, Swede operating the Domnarfvet works, manufacturing electr steel under the Kjellin process. Eight special grades o this steel are made, as well as wolfram and high-spee steel. Electro steel is supplied either rolled or hammere and in various shapes.

Raymond L. Gillispie, heretofore connected with th general sales department of the Pennsylvania Steel Com pany at Philadelphia, has been appointed sales manage of the frog and switch department, with office at the work at Steelton, Pa.

The Yellow and Blue Danger Signal

Dr. Francis D. Patterson, director of the departmen of sanitation and accident prevention, Harrison Bros. Co., Inc., Philadelphia, illustrates in Drugs, Oils an Paints the yellow disc with blue center which the abov company offers, after considerable experiment, as a uni versal danger signal. Dr. Patterson considers that ther are fundamental objections to the use of the red disc a a danger sign. He says that to the large group of ind viduals who are color blind to red a red disc conveys n warning. To their eyes it is any shade from gray to blac or green, if perceived at all. He says that red is evanes cent and difficult to distinguish in a poor light; also tha it fades on exposure to sunlight and unless repainted a frequent intervals turns white. The reasons he gives fo the adoption of the yellow disc with blue center are i substance: That yellow and blue are the only colors whic give rise to a normal color sensation as soon as they be come visible as colors, and therefore can be seen at a greater distance in daylight and in poor light than an other color or combination of colors; that they are th most luminous colors of the spectrum; that they are mor permanent colors and quite fast to sunlight; also that i the rare cases of persons whose ability to see yellow an blue is impaired these colors will be seen as red or gree and will thus give a protection not afforded by the colo red.

W. A. McDermid, sales manager of the Service Re corder Company, Cleveland, Ohio, announces the appoint ment of the Atlas Commercial Company of Ponce and San Juan, Porto Rico, as representative for the sale of th Service recorder. The Service Recorder Company is now represented by factory branches in Boston, New York Philadelphia, Baltimore, Washington, Atlanta, Buffalo Pittsburgh, Cleveland, Cincinnati, Indianapolis, Detroit Chicago, St. Louis, Kansas City and Minneapolis, and on the Pacific coast by the George F. Eberhard Company with offices in San Francisco, Los Angeles, Seattle an Portland. The company's extensive railroad business i handled by the Hopkins-Benedict Company, Chicago, Ill.

The Great Northern Railway Company is making pre liminary arrangements for the construction of a steel an concrete ore dock in place of its present No. 3 timber dock, at Allouez Bay, Superior, Wis. The work involves about $1,000,000. Last year the company replaced its No. 4 dock with a modern steel and concrete structure.

The Kokomo Steel & Wire Compay, Kokomo, Ind. has contracted with the Dodge Mfg. Company, Mishawaka Ind., for a 30,000-gal. Dodge Eureka water softener, made up of two 15,000-gal. machines. The decanter shells will be 17 ft. in diameter and 36½ in. high, while the lime tank shells will be 8 ft. in diameter and 39 ft. 10 in. high.

The National Machine Tool Builders' Association will hold its twelfth annual convention at the Hotel Astor New York City, October 22 to 24.

Obituary

WILLIAM J. ISAACSON, long prominent in the Southern pig-iron trade, died at Los Angeles, Cal., September 13. He was of Scotch descent and was a native of New Haven, Conn. He went to Liverpool when 21 years of age and entered the service of James Watson & Co., the great Scotch pig-iron merchants. He continued with that house for more than 14 years, and when the firm decided to develop iron ore and coal properties which it owned at Dayton, Tenn., Mr. Isaacson was chosen to take charge of operations, and he located in Cincinnati in 1884, at which time the Dayton Coal & Iron Company, Ltd., was organized. The general office of the company was then established at Cincinnati. Under his management the town and the company's works at Dayton were developed, and much of his time was spent directing operations at the plant. Mr. Isaacson was a pioneer in the introduction of Southern pig iron into general use in the territory north of the Ohio River. About 10 years ago, on the advice of his physician, he gave up the active management of the company, but continued until 1910 to act in an advisory capacity, after which he retired permanently. He leaves a widow.

WILLIAM H. WILDER, Gardner, Mass., representative in Congress, founder of the Central Oil & Gas Stove Company of his home town, and prominently connected with other industrial enterprises, died September 11, aged 55 years. A native of Belfort, Maine, he moved to Hubbardston, Mass., when a boy. After engaging in various pursuits he became identified with the stove business as an organizer of the Central Oil & Gas Stove Company, of which his son, Solon Wilder, is now the president, and brought about the consolidation of the Union Stove Company, Bridgeport, Conn., and the Florence Oil Stove Company, Florence, Mass. He was also the chief owner of the Boynton & Plummer Company, Worcester, Mass., manufacturer of blacksmiths' tools. Many patents were issued to him and he afterward became a patent attorney, commencing the study of law when he was 45 years old. He leaves a widow, two sons and three daughters.

HOWARD F. MARTIN, who met his death in the North Haven, Conn., wreck, on the New York, New Haven & Hartford Railroad, September 2, was a resident of Bridgeport, Conn., in the earliest part of his business career. For a time he was general manager of sales of the Farist Steel Company in that city. In August, 1890, he went to Steelton, Pa., as purchasing agent for the Pennsylvania Steel Company, remaining there until 1894, when he was appointed to the newly made position of general manager of sales. He organized that department in the Pennsylvania Steel Company's general offices at Philadelphia and remained at its head until August 1, 1912, when he resigned. Since that time he had been connected with the S. S. Eveland Engineering & Mfg. Company, Philadelphia, in the capacity of sales manager. Mr. Martin was 56 years old.

THURSTON M. PHETTEPLACE, Providence, R. I., assistant professor of mechanical engineering at Brown University, died September 7, aged 36 years. He had become well known for his research work and for his contributions on technical subjects. A native of Providence, he graduated from Brown in 1899 with the degree of Ph.B. and two years later, while an instructor, received the degree of M. E. In 1908 Columbia University conferred upon him the degree of A. M. He was a member of the American Society of Mechanical Engineers, the Society for the Promotion of Industrial Education, the Society for the Promotion of Engineering Education, and the Providence Association of Mechanical Engineers, of which he was president for two years. He leaves a widow and an infant child.

H. EMMETT REDMAN, secretary Mitchell-Lewis Motor Company, Racine, Wis., died September 10 from paralysis, aged 58 years. He was born in Louisville, Ky., and in 1903 went to Racine as credit manager for the then Mitchell-Lewis Wagon Company. On the consolidation of all Mitchell and Lewis vehicle and automobile interests in 1908, he was elected secretary of the company.

CHRISTOPHER H. STARKE, president Milwaukee Bridge Company, Milwaukee, Wis., died last week after a short illness, aged 79 years. With his five brothers he came to America from Germany in 1852 and established the first dredge, dock and railroad contracting business in Milwaukee. He founded the C. H. Starke Dredge & Dock Company, the management of which he relinquished a number of years ago to take active charge of the Milwaukee Bridge Company.

EDWARD SMITH, Malden, Mass., of the Smith-Gallison Company, Boston, Mass., brass manufacturer, died September 8, aged 61 years.

Carbon Steel Company's Products

The Carbon Steel Company, Pittsburgh, Pa., has issued a pamphlet calling attention to the various products it manufactures. This company, which at one time manufactured plates exclusively, has added other products and is now making steel bars of special quality, railroad axles, piston rods, crank pins, etc. Its plates are made by both the acid and basic processes, the acid steel being especially suitable for the manufacture of plates for fire boxes. The bars comprise the Weto brand, specially adapted for case hardening and various heat treatments; the Cromo brand, recommended for making anything to be subjected to considerable stress or shock; the Arbo brand, made with an addition of nickel and ferrochrome and adapted to automobile work and kindred purposes requiring a maximum of strength and toughness; the Nico brand, a standard straight nickel steel furnished in any carbon and from 3 to 5 per cent. nickel; the Peerless brand, intended for such purposes as die blocks and oil and water well bits and jar steel. The company's Cunningham forgings are made from acid steel, bottom cast in specially patented molds. An interesting portion of the pamphlet, occupying several pages, is a list of various uses of steel with the recommendations of quality for each.

Pennsylvania Welfare and Efficiency Convention

Under the auspices of the Engineers' Society of Pennsylvania, the third Pennsylvania Industrial Welfare and Efficiency Convention will be held in the Capitol at Harrisburg, October 28 to 30. The convention has been called by John Price Jackson, commissioner of labor and industry, and will comprise representatives of industrial establishments, engineers, directors and other employers of labor doing business in Pennsylvania, with representatives of labor and heads of the various State departments coming in contact with engineering and industrial affairs of that State. An exhibit will be held in connection with the convention, to be housed in the large building of the Harrisburg Railways Company, which is stated to be an ideal exhibition hall.

A prospectus has been issued by the chairman of the exhibit committee, J. V. W. Reynders, vice-president of the Pennsylvania Steel Company, Steelton, Pa., which gives a programme of the convention and full information regarding the details of the exhibit, including a diagram showing the location of booths.

Morgan Gas Producers for Australia.—The Broken Hill Proprietary Company, Ltd., through its consulting engineer, James B. Ladd, Philadelphia, has ordered the gas producers for its new steel plant in Australia from the Morgan Construction Company, Worcester, Mass. This order is for fifteen 10-ft. Morgan continuous producers, with George mechanical feeders.

The bi-monthly examination of bar-iron prices was made in Youngstown, Ohio, last week, and it was found that the average price on shipments of iron bars in July and August was slightly in excess of 1.50c., and this price entitles puddlers to a rate of $7 a ton for boiling in September and October, continuing the rate paid in July and August.

The Michigan Alkali Company, Detroit, Mich., has placed a contract with the Great Lakes Engineering Works for an 8000-ton steel steamer to be used in the stone trade. It will be 436 ft. long, 56 ft. wide and 30 ft. deep. This is the first boat order that has been placed with the Lake shipbuilders for some time.

The Trussed Concrete Steel Company, Youngstown, Ohio, has purchased some land adjacent to its plant on which it proposes to make some extensions.

The Machinery Markets

Considered in its entirety the machinery business of the country is irregular and new demand is at least a little below normal. With the near approach of the enactment into law of the new tariff schedule a keener interest in its provisions and a tendency to await its effects are noticeable in widely separated sections. In New York both sales and inquiries have fallen off and the proposed new tariff is recognized as a restraining influence. While some complaint is heard in New England as to recent decline of new business in some lines, others are doing well and most plants are busy. The machine tool trade in Philadelphia has been light and inquiries are not promising. A light demand and one mostly for single tools exists in Cleveland, the recent improvement not having kept up, but at the same time some plants are comfortably filled with orders. Cincinnati has been dull, but inquiry has increased somewhat, with lathe manufacturers doing the best business and the foundries recuperating from the recent strike. Both sales and inquiries have been more active in Detroit, where several small groups of equipment have been purchased by manufacturers. Milwaukee reports some small new business, but on the whole the situation is quiet. In the Central South activity is pronounced good in most lines although in others hesitation because of tariff influences is apparent. The indications in Birmingham are that business will be better this fall than it was at the same time a year ago. In St. Louis there have been no large inquiries, but there has been some improvement and the feeling is better in consequence. The building trades are more active in Texas than they were this time a year ago and general business is good, despite disappointment in some of the crop reports. More life is shown in the general machinery field on the Pacific coast although inquiries continue small and scattered and forward buying is lessened by the tendency to await the new tariff and the opening of the Panama Canal.

New York

NEW YORK, September 17, 1913.

The market is quiet in every particular. Sales are fewer and inquiries also have fallen off. What business there is consists almost entirely of small and scattered transactions involving one or two small machines. Manufacturers of automatic screw machines report a lessened demand for these machines, although those making screw machine products are busy filling orders. Finished brass and copper products are being consumed in excellent quantities also. There has not been much improvement in collections and their slowness continues a cause of complaint. Even large companies of unquestioned standing have requested unusual time concessions. Speculation regarding the new tariff schedule, soon to become law, continues to be heard and unquestionably is causing considerable hesitation in making purchases. It is admitted by those mostly concerned that whatever effect the new schedule may have upon prices is an unknown quantity, despite efforts to figure out changes which may be necessary to meet increased competition. The result is uncertainty, which may not be entirely eliminated until the new tariff is operative and its results are actually demonstrated.

The Wadsworth Chocolate Company, Newark, N. J., is erecting a 100 x 100 ft. fireproof factory building at 272-280 Jelliff avenue, that city. The basement will contain boiler room as well as electric and other machinery. The cost of the building with equipment is estimated at $100,000.

The E. & B. Holmes Machinery Company, Buffalo, will erect additions to its plant on Chicago street, south of Mackinaw street, at a cost of about $20,000. The main addition will be 45 x 116 ft., two stories, brick. Connecting this and the present buildings of the company, a new addition will be erected. A large part of the new construction will be used for warehouse purposes, made necessary by the growth of the company's business. A part of the equipment will include a 20-ton elevator.

Stephen Stanford & Sons, Inc., Amsterdam, N. Y., carpet manufacturers, have awarded contracts to John J. Turner & Son for a five-story, reinforced concrete building, with a frontage of 256 ft. The building will contain approximately 104,000 sq. ft. of floor space. The first floor will be used for dyeing and other stories for manufacturing and storage.

Contracts will be awarded soon for an extension to the plant of the J. Wiss & Sons Company, 35-39 Littleton avenue, Newark, N. J., manufacturer of shears, scissors, razors, etc.

The Bury Compressor Company, Erie, Pa., has started work on an addition to its plant extending the main building 100 ft., which has been made necessary by increased business.

John B. Riley, superintendent of State prisons, Albany, N. Y., is receiving sealed proposals until September 30 for boilers, steam apparatus and piping and for a new power plant, new generating plant and electric feeder system for Sing Sing prison at Ossining, N. Y.

The electric light plant, Croton Falls, N. Y., will receive bids for one 175-kw., 3-phase, 60-cycle, 2300-volt vertical generator with switchboard and instruments complete. George Juengst & Sons are the owners.

The Newbury Mfg. Company has commenced construction of a one-story manufacturing plant at Monroe, N. Y.

The Cohoes Company has been granted permission to construct a hydroelectric plant on the Mohawk River at Cohoes, N. Y.

McCleary, Wallin & Crouse, carpet manufacturers, Amsterdam, N. Y., are having plans prepared for an addition to their carpet and rug mill 200 x 245 ft., with an ell 32 x 152 ft., four and six stories, to cost about $300,000.

The American Malleable Company, Lancaster, N. Y., has increased its capital stock from $500,000 to $1,000,000. Over $200,000 of the increase is being expended for the enlargement of the company's plant and additional machinery and equipment.

Work on the plant of the Puritan Pure Food Products Company at Fredonia, N. Y., is being rushed, and it is expected it will be ready for equipment the latter part of this month.

The Mechanical Handler Company, which is building a plant at Hudson, N. Y., for the manufacture of freight-handling devices, will be ready to purchase its machinery equipment the forepart of next year.

New England

BOSTON, MASS., September 16, 1913.

Complaint is heard in some lines that August and the first two weeks of September showed a falling off in orders. This is laid, at least in part, to seasonable conditions. However, many works are busy with new orders, and others are running ordinarily full on business booked earlier in the summer. The hardware manufacturers are experiencing an excellent demand.

Referring to the option acquired by Bishop White, West Hartford, Conn., on the property and business of the Pratt & Cady Company, Hartford, Conn., manufacturer of steam and water specialties, it covers all the property, assets, name, patents, trade marks and good will, and may be exercised within six months from September 1, 1913, by paying to the receiver a sufficient sum of money to pay in full all duly allowed claims against the corporation together with interest on such claims at 6 per cent. to the date of payment and an additional sum sufficient to pay all the expenses of the receivership to the date of its termination. The Pratt & Cady Company went into the hands of a receiver September 9, 1912, at which time it found itself very much extended as to bank loans and in a tight money market. The concern has been operating under a receivership since that time, and E. L. King, the receiver, has reported to the court and to the creditors from time to

time that the company was making satisfactory headway. A reorganization committee appointed by the stockholders refused to call for the necessary assessments to pay off all the allowed claims and some six weeks ago the creditors took the matter into their own hands and offered the property for sale. The allowed claims against the old company are: Notes to banks, $390,008.46; notes to other creditors, $18,360.39; accounts payable, $69,504.13; commissions, $965.71; unclaimed wages, $36.19; a total of $478,874.88; of date June 30, 1913. While the plans for the company are not at present perfected as to detail, it is expected the option will be exercised somewhat before March 1, 1914, and that the business will be continued as a close corporation. The stock will probably not be held by more than three associates, with the exception of the necessary qualifying shares for directors. The plant is at present operating at about two-thirds capacity, showing on this basis very satisfactory progress. Now that the prospect of a removal of the receivership is at hand, little difficulty is anticipated of increasing the capacity of the works until 650 men are employed as compared with the present 450.

The directors of the port of Boston have decided upon the erection of a dry dock at South Boston at a cost of $3,000,000. The action follows an agreement under which the International Merchant Marine Company and the Hamburg-American line will pay $50,000 a year for 20 years, whether they use it or not. The structure will be the largest on the Atlantic seaboard, and will dock the largest of the liners. It will be 1200 ft. long, 150 ft. wide, with a depth of 35 ft. at low water.

The State Harbor Improvement Commission of Rhode Island is advertising for bids for a large concrete and steel pier shed to be erected at Providence, to be used for the housing of immigrants and for freight and baggage. The structure will be 110 x 400 ft., one and two stories. Modern freight-handling apparatus will be purchased.

Contractors along the line of the proposed Grand Trunk Railroad, extending the system from Palmer, Mass., to Providence, R. I., have been notified to resume work, and their contract time has been extended to make up for the long delay, which followed what seemed to be a final abandonment of a plan which had been carried forward in a large way.

The Bridgeport Die & Machine Company, Bridgeport, Conn., has begun the manufacture of a molding machine which was developed and formerly built by the Bridgeport Foundry and Machine Company. The Bridgeport Die & Machine Company has removed its business from 225 John street to more spacious quarters at Fairfield avenue and Portland street.

The National Mfg. Company, Waterbury, Conn., has purchased a tract of nine acres near the Watertown Railroad, and bounded by the property of the Waterbury Rolling Mill and the Waterbury Tool Company. The company proposes to erect works for the manufacture of small seamless tubing. The building will be 70 x 100 ft. It is a new business. M. J. Byrne, Waterbury, is one of the owners.

The P. & F. Corbin division of the American Hardware Corporation, New Britain, Conn., is erecting a large addition to its boiler house.

The American Brass Company, Waterbury, Conn., is erecting a factory, 45 x 160 ft., two stories, of brick and steel.

Additions to general manufacturing facilities of New England include the following: Factory, 40 x 200 ft., four stories, erected by citizens of Sanford, Me., to be occupied under lease by Lewis M. Carroll, shoe manufacturer; Richards Artificial Leather Company, Stamford, Conn., additional buildings, 55 x 110 ft., two stories, and 49 x 114 ft., one story; Heywood Bros. & Wakefield Company, Gardner, Mass., chairs, large additions; Charles H. Hartshorn, Gardner, Mass., chairs, addition 20 x 104 ft., three stories; Woonsocket Rubber Company, Woonsocket, R. I., addition, four stories and basement, 56 x 80 ft.

The Lionel Mfg. Company will erect a plant at Hamden, Conn., consisting of a two-story factory building 65 x 129 ft., of steel and reinforced concrete, with steel sash and skylights. The first floor will be devoted to machine and buffing departments, and the second floor to assembling and storage. A power house, with engine and boiler rooms, is included in the plans.

New corporations which are of industrial interest include the following: Hartford Lock Ring Company, Hartford, Conn.; paid in capital, $100,000; Joseph Merritt, Herbert Knox Smith and Ernest Walter Smith, incorporators; Mount Carmel Brass Works, Haddam, Conn., $2800 paid-in capital; Raffaele Biondi, president; Donegan Auto Body & Specialty Company, Hartford, Conn., automobile bodies and supplies; $19,000 paid-in capital; incorporators, W. R. Donegan, J. J. Walsh and Leon S. Risley.

The J. N. Lapointe Company, New London, Conn., has increased its capital stock from $45,000 to $100,000.

Philadelphia

PHILADELPHIA, PA., September 15, 1913.

The movement in machine tools since the opening of the month has been comparatively light. Little new business comes out, and it consists of single and small tool propositions. As a rule, large users of machine tools, particularly in the iron and steel and textile fields, find business less active and therefore proceed cautiously. Railroads in this district have placed orders for odd tools on recent lists, but there is little new inquiry out. A good share of the business recently inquired for by the Pennsylvania Railroad has now been placed, being divided among various sellers and makers. There is a fairly good demand for power equipment, particularly in the smaller capacities. Second-hand machinery continues dull. The demand for castings, both in iron and steel, continues irregular.

Details in connection with the new garage and machine shop for the Department of Public Safety, city of Philadelphia, to be erected at Eleventh and Reed streets, show that the proposed plant, for which plans and specifications were prepared by Ballinger & Perrot, engineers, will form a part of the present group of municipal buildings. The new structure will be 115 x 258 ft., three stories, of brick and terra cotta, and the windows having steel frame and sash. The floors, columns and roof will be of concrete. A boiler, engine and generator will be installed. A blacksmith shop will adjoin the main building.

Sub-bids are being taken by G. H. Thirsk, contractor, for a two-story power house to be erected for the Ontario Dyeing Company, Ontario and D streets. It was previously stated that considerable power equipment would be needed.

The William Steele & Sons Company, contractor and engineer, has taken out permits for the erection of a group of buildings for the Keystone Leather Company, Camden, N. J. One building, four stories, 68 x 165 ft., is for warehouse purposes. A one-story boiler house, 60 x 100 ft., and an engine house, 50 x 85 ft., are included in the plans.

The Penn Pressed Steel Company, Camden, N. J., has, it is stated, been incorporated with a capital stock of $25,000, and will erect a plant for the manufacture of various kinds of metal goods. The incorporators are T. A. Kuntz, J. Disbrow Baker and T. S. Saurman.

Bids will be received until October 1 for a 120 r.p.m. 1200 cu. ft. air compressor by the trustees of the State Hospital for the Insane, at Norristown, Pa. Specifications may be obtained at the office of Dr. W. A. Drysdale, consulting engineer, 415 Hall Building, this city.

The Philadelphia & Reading Railroad Company is taking bids for a one-story addition to the engine house and repair shop at Rutherford, Pa., from plans and specifications by William Hunter, chief engineer.

Plans for a one-story brick, steel and concrete power plant are being prepared by W. R. Rhoads, Chambersburg, Pa., for Wilson College, in that city. Information can be obtained, it is stated, from George Bartlett, director, Chambersburg, Pa.

The Gerhart Motor Cycle Company, Harrisburg, Pa., has been organized to manufacture motor cycles. It is said that the company will be an early buyer of machinery and tools.

Plans are reported about ready for estimate for a one-story and basement power house, 76 x 83 ft., to be erected at Glen Gardner, N. J., for the State Sanitarium for Tuberculosis. The building is estimated to cost about $65,000. Plans are by George S. Drew, architect.

James McClymot, architect, York, Pa., is said to have plans and specifications prepared for a two-story silk mill, 28 x 150 ft., to be erected in Hanover, Pa.

The Consolidated Gas, Electric Light & Power Company, Baltimore, Md., will expend $500,000 for extensions and improvements to its power plant at Westport, including a boiler house, stokers, pumps and heaters. The first installation will consist of six 1000-hp. boilers, equipped with automatic stokers. Contracts have been let for a 15,000-kw. turbo-generator. The company has also let a contract for a large new garage at West Arlington.

The Baltimore Optical Company, Clay and Liberty streets, Baltimore, Md., will erect a six-story brick building at 200-202 West Saratoga street. Haskell & Barnes, 301 North Charles street, are the architects.

Indianapolis

INDIANAPOLIS, IND., September 15, 1913.

The Ray Harroun Company of this city, manufacturer of a kerosene carbureter, has increased its capital stock from $50,000 to $600,000 in order to build a new and enlarged plant. A factory with 80,000 sq. ft. of floor space is required. Other articles will be manufactured, mainly fuel accessories such as strainers, tanks, fittings and filler caps. The principal stockholders of the company are Chicago and Pittsburgh capitalists, Ray Harroun of Indianapolis being patentee and resident manager. The new plant will cost $200,000.

The Union City Body Company, Union City, Ind., has increased its capital stock from $30,000 to $75,000.

The Krell Auto-Grand Piano Company's plant, Connersville, Ind., has been sold at receiver's sale to Lawrence Maxwell of Cincinnati for $80,000.

The Western Gas Construction Company, Fort Wayne, Ind., will construct the gas plant for the municipality of Lebanon, Ohio, recently mentioned as contemplated.

The Delto Electric Company, Marion, Ind., has been incorporated with $25,000 to manufacture electrical goods. J. W. Stephenson, S. H. Smith, A. E. Case and others are interested in the company.

George S. Cook, Hope, Ind., and Martin M. Nading, Flatrock, Ind., have purchased a site at Columbus, Ind., for an ice plant to cost $50,000.

The plant of the Indiana Mfg. Company, Peru, Ind., maker of refrigerators, sewing machines, etc., is to be sold October 9 by order of court. The company is capitalized at $500,000. Elbert Walker Shirk is president.

The American Motor Wheel Company has been incorporated at Crawfordsville, Ind., with $600,000 capital stock to manufacture automobile trucks and motors. The directors are W. H. Owen, S. C. Rowland and John Vajer Wilson.

The La Porte Mat & Mfg. Company, La Porte, Ind., has been incorporated with $10,000 capital stock to manufacture metal mats and other articles. The directors are Edwin T. Fessenden, C. W. Elliott and H. W. Reeves.

Schalk Bros., millers, Anderson, Ind., will add a 30-ton ice plant to their plant, to begin operation about the first of the year.

The Electric Light Company, Fort Branch, Ind., has been incorporated with $20,000 capital stock to supply light, heat and power. The directors are Walter C. Polk, Homer T. Genung and Wilbur A. Polk.

The Jasper Desk Company, Jasper, Ind., has been incorporated with $12,000 capital stock to manufacture office furniture. The directors are Louis P. Joseph, Leo C. John and John Gramelspacker.

Cleveland

CLEVELAND, OHIO, September 15. 1913.

Dealers report the demand light and limited almost entirely to single tools. The recent improvement in inquiries has not kept up, and very few new inquiries are reported. Builders of most lines of machinery report their plants comfortably filled with work, but new demand is dull. It is stated that many of the automobile builders have not yet reached a decision regarding the type of their next season's cars, and until this matter is decisively determined they will defer buying additional machinery and automobile parts. In the foundry trade makers of gray-iron castings report that the demand is holding up well.

The Chandler & Price Company, Cleveland, maker of printing presses, will shortly begin the erection of two plant extensions. These will include an office building 33 x 76 ft. When that building is completed an extension 41 x 125 ft. will be built to its factory building to provide additional room for various manufacturing purposes. Both buildings will be of brick and steel, four stories, with basement.

The De Mooey Brothers Company, Cleveland, has been incorporated with a capitalization of $10,000 to manufacture marine engines and to do general machine-shop business. The company has a plant on East Fifty-fifth street.

The city of Cleveland, through W. J. Springborn, director of public service, will receive bids September 23 for a steam turbine-driven generator, steam and feed-water piping, a coal and ash conveyor and freight elevators for the city water department.

The United Engineering & Construction Company, now located in its new offices, 1113 Schofield Building, Cleveland, Ohio, would like to receive catalogues from manufacturers of material and equipment covering civil, mechanical and architectural engineering.

The Youngstown Foundry & Machine Company, Youngstown, Ohio, has let a contract to the Hunter Construction Company of that city for another addition to its plant. The building will be 70 x 100 ft., of steel construction, and will be used for cleaning and shipping department. A 15-ton electric crane will be installed.

The Bay View Foundry Company, Sandusky, Ohio, announces that it will shortly begin the erection of a new plant in the west end of that city which will be known as plant No. 2.

F. H. Brightman, who recently severed his connection with the Brightman Hammered Nut Mfg. Company, Sandusky, Ohio, is planning the establishment of a new plant for the manufacture of hammered nuts. Mr. Brightman is working on a new type of machine for making these nuts which he expects to perfect in a short time.

The Cleveland Ice Machine & Mfg. Company, Lorain, Ohio, has increased its capitalization from $100,000 to $150,000 to provide for an increase in business.

A new lighting and power plant will be installed by the County Commissioner at the County Infirmary, Mt. Vernon, Ohio. Plans are being prepared by R. C. and W. S. Anderson, Mt. Vernon.

The Jackson Shear Company, Fremont, Ohio, will enlarge its plant by the erection of a new building 24 x 80 ft. It is stated that the company will hereafter manufacture its own castings. This company has purchased the adjoining plant of the Fremont Furnace Company and will use this building for manufacturing purposes unless a reorganization of the furnace company is effected.

Orrville, Ohio, has voted $41,000 bonds for the installation of a municipal electric light plant.

The Bacher Iron & Steel Company, Canton, Ohio, has been incorporated with a capitalization of $100,000 by Peter Bacher, Henry Bacher, Samuel J. Pruden, J. V. Price and T. M. Lee.

The Newark Tool Company, Newark, Ohio, recently incorporated with a capitalization of $150,000, has completed its organization by the election of W. A. Erman president and general manager, John F. Gerd vice-president and sales manager and C. O. Erman secretary and treasurer. The company will manufacture stay-bolt tools for locomotive and other products.

A hydroelectric plant will be erected by the Walsh Milling Company, Cuyahoga Falls, Ohio. Three 250-hp turbine wheels will be installed to furnish power for the milling company's plant and that of the Falls Clutch & Machine Company. The latter company plans to drive its machinery with individual motors.

The Universal Machine Company, Toledo, Ohio, has increased its capitalization from $100,000 to $125,000.

The National Electric Sign & Construction Company, Mansfield, Ohio, which was recently incorporated with a capitalization of $50,000, will be established in the Scholl Building, North Main street, Mansfield, for the manufacture of signs in metal and other materials. Edward P. Robbins is president of the company and Percy S. Dittenhaffer is secretary.

Cincinnati

CINCINNATI, OHIO, September 15, 1913.

The machine tool business is still dull but the volume of inquiries shows some increase. With the exception of a few export inquiries single tools are asked for. Lathe makers are probably enjoying a slightly better business than manufacturers of other kinds of tools. Local foundries are gradually regaining the trade lost on account of recent labor troubles and nearly all of them are busy but in a number of instances only curtailed forces are used. There is no change in the second-hand machinery situation, business being as dull as it has been reported for several weeks past. Manufacturers and merchants are taking a keen interest in the Team Owners' Association recently formed to combat the teamsters' union in its efforts to force recognition of the union. At a meeting last week it was decided to make the organization a permanent one and in a few days officers will be chosen by the different committees appointed. It is the object of the association to render abortive any attempts on the part of labor agitators to cause manufacturers and merchants embarrassment on account of striking teamsters.

The Gruen Watch Case Company, Cincinnati, is having plans prepared for a factory building to be erected on McMillan street.

J. R. Stevens & Co., Cincinnati, have been awarded the contract for an extensive addition to the plant of the Rossville Distilling Company, Lawrenceburg, Ind.

The J. M. Schott & Sons Company, Cincinnati, has awarded the contract for a small addition to its cooperage plant on McMicken avenue.

The Cincinnati Car Company, Cincinnati, has acquired a manufacturing building adjoining its plant at Winton place, which will be fitted up as an assembling department. The company builds street cars of different types, and is closely affiliated with the Cincinnati Traction Company.

The Lunkenheimer Company, Cincinnati, has about decided to go ahead on the erection of a large foundry addition, mention of which was made several months ago. B. L. Baldwin & Co., Cincinnati, architects, have completed the plans, which call for a structure 150 x 350 ft., two and three stories, and a few smaller buildings.

The Queen City Motor Company, Cincinnati, is letting contracts for the construction of the large garage and repair shop recently mentioned.

The Dayton Ice Mfg. & Cold Storage Company, Dayton, Ohio, plans to make additions to its plant that will represent an outlay of approximately $100,000, including machinery requirements.

A new pumping station and a filtration plant will be installed at Ironton, Ohio, on the recommendation of Hering & Gregory, engineers, New York City.

The National Motor Company, Springfield, Ohio, is erecting a one-story brick addition to its plant, 36 x 60 ft., which will be used for assembling purposes.

Work has commenced on the large storage warehouse and assembling plant of the Moline Plow Company, Columbus, Ohio, mention of which was recently made. The company's head office is at Moline, Ill.

The American Pad & Textile Company, Greenfield, Ohio, has plans under way for a large branch factory to be erected at Chillicothe, Ohio. A number of small electric motors and special machinery will probably be required.

The Faultless Rubber Company, Ashland, Ohio, has let the contract for a three-story factory building, estimated to cost $40,000. T. W. Miller is president of the company.

It is rumored that the Maxwell Motor Car Company will soon have plans made for an extensive addition to its plant at Dayton, Ohio. No building details are yet available.

Milwaukee

MILWAUKEE, WIS., September 15, 1913.

Machinery production in this district is showing slight increases as the result of the booking of some small new business, but on the whole the situation is quiet. The labor situation is satisfactory, there being no prospect of trouble and a supply of skilled and unskilled workmen to take care of any demands. The Plankinton Hotel letting, which is expected in December will involve several thousand tons of steel for spring delivery, with a heavy requirement for power and lighting machinery. The second-hand machinery and tool business is satisfactory and there is no surplus.

Charles W. Somers, of Cleveland, Ohio, with whom are associated Harry Payne Whitney, Louis E. Stoddard and Frank S. Butterworth, of New York, announced last week that the present Plankinton Hotel will be replaced with a large steel structure combining a hotel, theater and office and store building, 12 to 16 stories, approximately 250 x 350 ft. Plans and specifications are in preparation in New York and Cleveland, the name of the designer being withheld for the present. George W. Harvey is managing the project at Milwaukee.

The Cedarburg Milk Company, Milwaukee, has plans for a $100,000 milk handling, pasteurizing and distributing plant, to be erected at Twelfth street and Teutonia avenue, which will require power and special dairy equipment and machinery costing in excess of $45,000. Chas. H. Tharinger, Milwaukee, is architect and engineer.

The American Brass Foundry Company, Milwaukee, Wis., has increased its capital stock from $5000 to $12,000. The company contemplates some extensions and purchases of equipment.

The Davis Mfg. Company, Milwaukee, manufacturer of automobile trucks, tractors and mine locomotors, will complete a new factory by the first part of next year, and will then be in the market for additional machinery and equipment. Details are not yet available.

The Wisconsin Construction Company, Chippewa Falls, Wis., was awarded the general contract for the construction and equipment of the new vocational school building for the industrial and manual training departments of the Stout Institute at Menomonee, now a State institution. It will be 84 x 175 ft. and will cost $75,000. The equipment will be for teaching plumbing, machine shop practice, carpentry, cabinet-making, mill work, architectural drafting, pattern-making and bricklaying. L. D. Harvey is superintendent.

The Chicago & Wisconsin Valley Street Railway Company, Madison, Wis., will start active work Sept. 15 on the construction of its interurban line from Madison to Portage. The franchise requires the company to have cars running on regular schedule by January 1, 1914.

The Chain Belt Company, Milwaukee, will erect a new coal handling system for the municipal electric light and power plant at Oconomowoc, Wis., at a contract price of $2112.

The plant of the Matheson Boat Company, Oshkosh, Wis., builder of gasoline and steam power boats, was damaged to the extent of $15,000 by fire in its main shop. The company intends to rebuild immediately.

The Chicago Blow Pipe Company, Chicago, was awarded a contract to install a complete blower and refuse collector system in the large woodworking plant of the Upham Mfg. Company at Marshfield, Wis. The cyclone or separating cylinder is to be the largest ever constructed.

An extensive equipment of woodworking machinery, planers, etc., will be required soon by the Badger Chair Company, Sheboygan, Wis., which has been organized with $25,000 capital by S. B. Crocker, founder of the Crocker Chair Company, who recently retired from that company to establish a new industry. J. E. Schmidt and W. J. Rietow, of Sheboygan, are also interested in the project.

Poynette, Wis., has voted bonds for an electric light plant.

Luck, Wis., has voted $4500 bonds for constructing an electric light plant. Bids for construction will be asked at once.

The City Council of Menasha, Wis., has decided to order at once another 225-hp. Diesel engine, to furnish additional power for its electric light plant.

The West Bend Barn Equipment Company, West Bend., Wis., is preparing plans for the erection of a new factory to be of concrete construction, 60 x 60 ft., three stories.

Chicago

CHICAGO, ILL., September 15, 1913.

J. F. Dornfeld, 2148 Washington boulevard, Chicago, has finished plans for a one-story galvanizing factory, 40 x 100 ft., to be erected for F. C. Brightly at Van Buren and South Rockwell streets. The new building will cost about $30,000.

The Chicago Hardware Foundry Company, North Chicago, Ill., has completed plans for a $15,000 one-story foundry, 81 x 127 ft. W. L. Stebbings, 53 West Jackson boulevard, is the engineer.

R. S. Lindstrom, architect, has finished plans for a three and one-story machine shop, dry kiln and boiler house, 100 x 120 ft., and 70 x 120 ft., to be erected for Holmquist & Co. at West Thirty-fifth street and Maplewood avenue, Chicago.

The Alliance Company is erecting a one-story brick factory addition, 64 x 71 ft., at 1928 Clybourn avenue, Chicago, at a cost of $8000. E. A. Seipp, 179 West Washington street, is the architect.

W. G. Barfield, architect, has completed plans for a two-story brick factory 66 x 143 ft. to be erected at 1450-54 Dayton avenue, Chicago, for the Seng Company, at a cost of $10,000.

The Morrison Specialty Company, which has recently removed its factory from Morrison, Ill., to Dubuque, Iowa, is installing new machinery for the manufacture of rat traps and other novelties.

The Edwardsville Garage & Automobile Supply Company, Edwardsville, Ill., has been incorporated with $10,000 capital stock by Thomas J. Fahenstock, Olin H. Giess and Walter P. Kriege.

The machine shops of the New York, Chicago & St. Louis Railroad, located at Stony Island avenue and East Ninety-third street, South Chicago, were destroyed by fire September 9 with a loss estimated at $500,000.

The A. Clemetson Mfg. Company, 220 North Elizabeth street, Chicago, manufacturer of office furniture,

has purchased ground at Division street and North Homan avenue, where it is understood a factory will be built.

The Joslyn Mfg. & Supply Company, 133 West Washington street, Chicago, has secured a site in North Kansas City, Mo., on which a new one-story building, 113 x 200 ft., will be erected, suitable for the manufacture and jobbing of electrical supplies.

The Aerothrust Engine Company, Chicago, has been organized in the offices of John J. Beilman, 79 West Monroe street, with a capital of $2500 for the purpose of manufacturing engines.

The Alexis Creamery Company, Alexis, Ill., has been incorporated with a capital stock of $16,000 by C. A. Nelson, Geo. W. Peadon and F. H. Blayney.

The Champaign Ice Cream Company, Champaign, Ill., has been incorporated with a capital stock of $25,000 by Delos Huxtable, James W. Kisner and F. W. Holmes.

The Consumers' Water & Light Company, Marseilles, Ill., has been incorporated with a capital stock of $50,000 by W. H. Carnahan, H. J. Vance and J. C. Johnson.

The Galesburg Railway, Lighting & Power Company, Galesburg, Ill., has been incorporated with a capital stock of $50,000 by W. H. Carnahan, H. J. Vance and E. W. Fowler.

The Freeport Gas Engine Company, Freeport, Ill, has purchased a site on South Van Buren street and is razing the buildings thereon to prepare for a factory to be erected next spring.

The plant of the Red Jacket Mfg. Company, Davenport, Iowa., was damaged to the extent of $8000 by a fire which practically destroyed its foundry. Work of rebuilding will begin at once.

Bids will be received by the city clerk, Kanopolis, Kan., until October 6 for a complete waterworks system and for an alternating current light plant equipment, either steam or oil-driven.

Dorchester, Neb., has voted $15,000 bonds for waterworks and $5000 bonds for an electric light plant.

Niobrara, Neb., has voted $14,000 bonds for waterworks.

Oxford, Kan., has voted $20,000 bonds for waterworks. Rollins & Westover, Kansas City, Mo., are to be engineers. J. P. Lester, Jr., is city clerk.

Detroit

DETROIT, MICH., September 15, 1913.

The local machinery market has shown more activity the past week, both orders and inquiries being more plentiful. Several small groups of equipment were purchased by local manufacturers during the week and the volume of single tool sales was better than normal. The demand for boilers and engines continues brisk, but that for electrical equipment has slackened. Second-hand machinery is moving fairly well. Financial difficulties are troubling several of the local automobile manufacturing companies, and with one or two exceptions little buying is being done by the automobile companies. The volume of building shows a decided shrinkage and no new propositions of importance are before the trade.

The S. & M. Motor Company, Detroit, has been organized for the manufacture of automobiles. The company has acquired a large two-story factory at 1900 Mt. Elliott avenue and will begin manufacturing within a short time. A large part of the equipment has already been purchased. Walter C. Martin and Edward E. Stroebel are among those interested in the new company.

The M. & S. Gear Company, now located in Kansas City, Mo., will, it is announced, remove its plant to Detroit. The company has established temporary offices at 1026 Dime Bank Building pending the erection of its plant. It manufactures differential gears. Lewis L. Scurlock is president.

The Emerson Mfg. Company, Detroit, has been incorporated with $5000 capital stock to manufacture and deal in machinery and tools. The incorporators are George B. Emerson, Henry G. Schwoeppe and Louis Knudson.

The Detroit Copper & Brass Rolling Mills, Detroit, will erect a new power plant, 62 x 98 ft., one story, at a cost of $8000.

The Detroit Turbine Mfg. Company, Detroit, has been incorporated with $50,000 capital stock to manufacture steam turbines, gasoline engines and accessories. The incorporators are Peter H. F. Spies, James J. Mylon and George E. Gowing.

The Auto City Boat Company, Detroit, has been incorporated with $10,000 capital stock to manufacture automobile accessories. H. C. Goodrich and E. O. Eck are the principal stockholders.

The Michigan Fireproofing & Plastering Company, Detroit, has been incorporated with $10,000 capital stock by E. W. Leech, W. H. Carl and others to manufacture fireproof building material.

The Buhl Land Company, Detroit, controlled by the Buhl foundry interests, has taken out a building permit covering the erection of a three-story factory building, 60 x 380 ft., at Fort and McKinstry streets.

The Oleson-Adams Company, Detroit, has been incorporated with $10,000 capital stock to manufacture automobile parts. The principal stockholders are John A. Oleson and William R. Adams.

The City Pattern Works, Detroit, has been incorporated with $2000 capital stock by Fred J. and Vaughn Reid to manufacture patterns.

The Excelsior Tool & Repair Company, Detroit, has increased its capital stock from $7000 to $20,000 and changed its name to the Excelsior Tool & Gauge Company.

Frank T. Hulswit and associates, Grand Rapids, Mich., have purchased the plant of the Grand Rapids Motor Truck Company at receiver's sale. The purchasers propose to operate the plant along new lines.

The Niles Invisible Door Check Company, Niles, Mich., has been incorporated to operate a plant for the manufacture of door checks. F. N. Bonine and Charles E. White are among those interested in the new company, which is capitalized at $25,000.

The Lansing Foundry Company, Lansing, Mich., has been incorporated with $100,000 capital stock and will establish a plant for the manufacture of all kinds of castings. Modern foundry equipment will be installed, and it is planned to begin operations November 1. J. H. Moores is president, M. R. Potter vice-president and E. H. Wildt secretary and general manager.

The Cowell Tool & Supply Company, Grand Rapids, Mich., has incorporated with $15,000 capital stock to manufacture threading dies and other tools. Charles E. Richmond and F. O. Culler are among those interested.

At the annual meeting of the A. B. Stove Company, Battle Creek, Mich., held September 7, it was announced that the erection of a large foundry to supply the company would soon be begun. The present officers, headed by W. K. Berry, president, were re-elected.

The Lunde Boatbuilding Company, Ludington, Mich., has been incorporated as a successor to the shipbuilding business of Lunde & Sons. It is the intention of the company to erect a new boat shop, 50 x 50 ft., one story.

Articles of incorporation have been filed by the Phillips Metallic Hose Company, Jackson, Mich. to manufacture metallic hose for coupling cars. The company is capitalized at $100,000 and will establish a plant at Jackson.

F. T. Tappen, Coldwater, Mich., will establish a shoe factory at Grand Rapids, Mich.

The Defoe Motor Boat Company, Bay City, Mich., will rebuild its factory which was recently burned on a scale sufficient to double its former capacity.

Ray Ellis, superintendent of the Municipal Electric Light plant, Blissfield, Mich., will prepare estimates of cost of enlarging the plant and the installation of additional machinery to provide for a 24-hr. service.

St. Louis

ST. LOUIS, MO., September 15, 1913.

Conditions in the machine tool market at this point show gradual improvement, indicating a disposition not to regard so pessimistically as at first the crop conditions, at least so far as relates to the aggregate of money available for use. In consequence there is a better feeling and while no large lists are coming out there is freer buying with a more general inquiry. Second-hand machinery is in some request.

The Commercial Foundry Company, St. Louis, recently incorporated by William McNamee, Frazer P. Gibbs and others has begun the construction of a building and will equip it at once.

The St. Louis Butterine Company, St. Louis, has been incorporated, with a capital stock of $15,000, by Louis B. Nichols, Jr., Charles H. Nahr, G. C. McMillan and others and will equip a plant for the manufacture of butterine, etc.

The Biston Coffee Company, St. Louis, has been in-

corporated, with a capital stock of $60,000, by Gus Biston, Jr., William L. Allen and Ferdinand A. Biston and will equip a plant for roasting, grinding and otherwise preparing coffee, etc., for the market. The company is in the market for the needed equipment.

The elevator of the Stanard-Tilton Milling Company of St. Louis, at Alton, Ill., was destroyed by fire September 12 with a loss of $200,000. It will be replaced.

The Kearney Electric Light Company, of Kearney, Clay County, Mo., has been incorporated with a capital stock of $15,000 by Thomas H. Henderson, Lee Major and John A. Eby, and will equip a public service plant.

The waterworks system at Butler, Mo., has been sold to Charles W. Stephenson, of Kansas City, Mo., who is reported to have plans for considerable improvement and extension.

A. Anderson & Company, St. Louis, have been awarded the contract for the power house of the new Missouri State capitol at Jefferson City, Mo., equipment for which will be purchased under a separate contract.

An ice plant is to be installed at Burlington Junction, Mo., by L. Monk and T. E. Fordyce.

S. W. Crall has plans for the construction and equipment of an ice plant at Chauncey, Mo.

H. P. Lamberson has plans for the installation of the necessary equipment at Rocky Comfort, Mo., for the development of a tripoli deposit.

A sorghum mill to cost about $250,000 is to be established at Fort Smith, Ark., under a contract between the Business Men's Club and M. G. Clymer and R. Best, both of St. Louis, Mo.

The Hope Lumber Company's mill, at Hope, Ark., reported burned with a loss of $15,000, will be rebuilt.

The Sheldon Handle Company's plant at Beirne, Ark., is reported burned with a loss of $15,000. Plans for replacement are under way.

The Brown Lumber Company, Paragould, Ark., has been incorporated, with a capital stock of $25,000, by H. W. Brown, John G. Meiser and T. H. Garrett and will equip a mill.

A. V. Mills & Son, Paragould, Ark., have obtained the contract for canal and levee construction work in the St. Francis drainage district and are in the market for equipment for the work.

The Myers Stave & Mfg. Company, Piggott, Ark., has been incorporated with $25,000 capital stock. The company is taking over a plant in operation and is making oak heading and barrel staves. The company expects to install a 150 to 200-hp. boiler and a 100-hp. engine. J. M. Myers is president; G. W. McMillian, vice-president; J. R. Myers, secretary and treasurer.

The Cherokee Light & Fuel Company, Locust Grove, Okla., has been incorporated with a capital stock of $15,000 by E. E. Atherton, J. M. Conner and E. R. Wilson and will equip a public service plant.

McClintock, Low & Letson, Bartlesville, Okla., will establish an ice plant of 25 tons daily capacity at Dewey, Okla., and are in the market for necessary equipment, including power plant.

The Electric Chemical Co., Hugo, Okla., has been incorporated with a capital stock of $25,000 by J. J. McIntyre and F. D. Copping, of Hugo, and J. T. Crow, of Antlers, Okla., and will equip a plant using electrical equipment in its processes.

Sayre, Okla., has authorized $13,000 bonds for waterworks.

J. N. Leonard, West, Miss., is reported to be in the market for a boiler and engine, second-hand equipment preferred. The engine is to develop about 25 hp.

The Evansville Gin Company, Evansville, Miss., has been incorporated with a capital stock of $13,500 by Burch Williams, W. T. Brewer and W. J. Floyd.

The Dye Formo Aseptic Company, Vicksburg, Miss., recently incorporated with $250,000 capital by Frank E. Hale, Ernest C. Dye and others, will manufacture a specially sterilized brush with attached sterilizing equipment.

The Southern Pacific Company, under the direction of Hiram W. Sheridan, general superintendent, is reported as having plans for the equipment of a large corn shelling elevator at Thibodeaux, La.

The North Louisiana Broom Factory, Shreveport, La., will equip a plant with a capacity of 50 dozen daily. F. D. Bickham is president.

The Bell Mfg. Company, West Monroe, La., is equipping a sash and door plant and is erecting a dry kiln, with accessories, at a total cost of $50,000.

The city of Marksville, La., has contracted with C. A. Reese, of Shreveport, La., for the equipment of a waterworks and electric light and power plant to cost $23,500.

The Central South

LOUISVILLE, KY., September 15, 1913.

A peculiar condition exists in the local machinery trade. Most manufacturers report that business is good, and the demand for boilers and special equipment is strong enough to create activity. However, many people feel that current business is too good for the general situation, inasmuch as many lines of business are hesitating as the result of the poor corn crop, currency legislation and tariff revision. In other words, business men, including members of the machinery trade, have apparently taken the rather illogical attitude that since something unpleasant ought to happen, they should govern their business by that possibility instead of present prosperity. As indicated, most plants are busy, though electrical equipment is not selling as well as heretofore.

The Kentucky Distilleries & Warehouse Company, with general offices in Louisville, is building a new power plant for its Elk Run distillery, and will be in the market for boilers and other equipment.

The Henry Vogt Machine Company, Louisville, reports a heavy demand for boilers. It has sold six 500-hp. water-tube boilers to the Standard Oil Company for delivery at Whiting, Ind., and three 300-hp. to be installed at Casper, Wyo.

George Schoeneman, 1500 South Seventh street, Louisville, is building an addition to his blacksmith and woodworking shop. Electric forges are to be added to the equipment.

The Number One Distillery Company, Twenty-eighth street and Broadway, Louisville, has been given a permit for the erection of a 400-bu. distillery, while no new power equipment will be needed. Milling and conveying machinery for the grain mill will be required. Address Supt. Vessels.

The addition to the plant of Wm. Schuff & Co., Louisville, tanners, is almost completed, and the company will be in the market for motors for its cutting machinery in the near future. Generating equipment may also be installed. Address F. W. Wagner.

The power plant of Palmer & Hardin, Louisville furniture manufacturers, was burned last week, boilers and engines being a total loss. The company will replace the plant in the immediate future.

The Grayson Springs Hotel Company, Grayson Springs, Ky., organized with $600,000 capital stock, has had plans prepared by G. V. Newel, Chicago, for a hotel building costing $450,000. Heating and lighting plant are included in the plans.

The Kentucky Block Coal Company, Hazard, Ky., incorporated with $30,000 capital stock, will install a mining plant with a capacity of 1000 tons a day. J. B. Allen is in charge.

The Bowling Green Stone Company, Hopkinsville, Ky., has been incorporated with $10,000 capital stock and will develop a stone property near that city. C. A. Groth and James L. Langley, Joliet, Ill., are the principal stockholders.

Sturgis, Ky., has created a waterworks franchise, and will offer it for sale in the near future. A local company is being organized to purchase the franchise and put in a plant.

The Central Trust Company, Owensboro, Ky., is building a garage at Fourth and Locust streets, with provisions for a repair shop. The name of the lessee has not been announced.

Stewart Dorsey, Carlisle, Ky., has begun the erection of a garage, which will have a machine shop for automobile and farm implement repairs.

The Farmers' Tobacco Warehouse Company, Bowling Green, Ky., will erect and equip a loose leaf warehouse. Presses, elevators, etc., will be needed. G. W. Hinton is manager.

The Lack Malleable Iron Company, Paducah, Ky., reports that the capacity of its foundry is being enlarged.

The Beaver Lumber Company, Ashland, Ky., which was recently incorporated with $15,000 capital stock, will erect a sawmill at Chapman, Lawrence County, Ky. J. W. Kitchen may be addressed at Ashland.

C. H. James, Leitchfield Bottling Works, Leitchfield, Ky., may be addressed in regard to plans for the enlargement of the plant, the capacity of which is to be doubled.

Taylorsville, Ky., is planning the installation of a waterworks system following a recent disastrous fire. Address the mayor.

Dr. J. H. Ashlock and Marion Hoover, Glendale, Ky., have begun the erection of a flour mill and will be in the market for the necessary machinery in the near future.

The Frankfort Motor Car Company, Frankfort, Ky., incorporated with $25,000 capital stock, will put up a garage and automobile repair shop. James E. Manford is secretary and treasurer.

The Hazard-Dean Coal Company, Hazard, Ky., is in the market for motors for the operation of coal mining machinery. S. Davis Hughes is superintendent.

The Bavarian Brewing Company, Covington, Ky., will erect a cold storage plant. The cost of the plant and machinery will be in the neighborhood of $50,000.

The Cloverport Ice Company, Cloverport, Ky., has decided to establish an electric light plant in connection with its present factory and will purchase the machinery at once. A. A. Simons is president of the company.

The Wood Auto & Machine Company, Carrollton, Ky., is erecting a new shop building and will be in the market for machine tools in the near future.

The city of Harlan, Ky., has plans for the equipment of a waterworks plant to cost $20,000.

The Maysville Ice Company, Maysville, Ky., is having plans prepared for the enlargement of its plant, increasing its daily capacity to 40 tons.

Jesse Kirby, Smith's Grove, Ky., is completing the equipment of a machine shop for the repair of automobiles.

The Bardstown Garage, Bardstown, Ky., plans to install a machine shop for repair work of all kinds. Len Hurst is manager.

The Tennessee Utilities Company has been organized at Tullahoma, Tenn., for the purpose of building a water power plant on Elk River. It is estimated that the plant proposed will develop 20,000 hp. The company plans to begin construction work about November 1. G. M. Whitson is president and associate engineer.

W. H. Rodger, W. A. Sherman and others have formed a company at Dayton, Tenn., with a capital of $15,000, to establish a cannery.

The Riceville Knitting Mills, Riceville, Tenn., with a capital stock of $35,000 has been incorporated by R. I. Fisher, C. W. Oliphant, D. H. Roberts and others.

The power plant of the Liberty Mills, Nashville, Tenn., was badly damaged recently by the explosion of the flywheel in the engine-room. The machinery destroyed will be replaced.

C. Houston, mayor, Lewisburg, Tenn., is receiving bids for $20,000 waterworks.

Lewis & Adcock, Knoxville, Tenn., will erect a flour mill, which with its equipment will cost $25,000, replacing the plant which was recently burned.

The Electric Light Commission, Monroe, N. C., expects to purchase shortly one 3-in. suction, 2½-in. discharge centrifugal pump, direct connected to induction motor, to carry 60-lb. pressure. W. H. Crow is superintendent.

Texas

AUSTIN, TEXAS, September 14, 1913.

Notwithstanding reports of serious deterioration of the cotton crop in different localities of the State, business continues to be exceptionally good. All lines of building trades are more active than at this time last year. In Arizona and New Mexico much attention is being given to mining development and good orders for machinery are being placed.

G. W. Stough, of Kansas City, Mo., and associates are preparing to pipe natural gas from wells near Mexia to Waco for the purpose of supplying manufacturing plants and private consumers of that city. The towns of Mart and Prairie Hill will also be supplied from the same source. The cost of the proposed pipe line and distributing systems will be approximately $500,000.

The Southern Engine & Pump Company has been organized at Houston with a capital stock of $40,000. C. W. Marlin is interested.

The El Paso Gas Company has been organized with a capital stock of $1,300,000. It will operate in El Paso. Knowles Pittman of that city is the principal stockholder.

The El Paso Valley Water Users' Association, which was recently chartered under the laws of Arizona, will operate as a public utility corporation in El Paso and vicinity. It has a capital stock of $1,800,000.

The Farmers' Gin Company will erect a cotton gin at Corsicana. W. R. Kenner is interested.

The Beaumont Cotton Oil Company has been organized for the purpose of erecting a cotton-seed oil mill at Beaumont. Joseph E. Carroll, L. F. Gilbert and L. P. McCord are the incorporators.

The Beeville Light & Power Company, which has a capital stock of $150,000, will construct an electric light and power plant at Beeville. T. W. Robertson, A. H. Murris and C. M. Chambers are the incorporators of the company.

The Standard Square Bale Compress Company will construct a cotton compress at Grand Saline. Mark Mayer is interested.

The Austin Gas Light Company has increased its capital stock from $400,000 to $450,000 for the purpose of providing for improvements that it will make to its gas manufacturing plant at Austin. H. M. Moore is manager.

Bids will be received by G. A. Bodenheim, mayor, Longview, Texas, until October 8 for a mechanical filtration plant.

Belton, Texas, has voted $20,000 bonds for waterworks.

Birmingham

BIRMINGHAM, ALA., September 15, 1913.

Good reports are coming from the machinery and machine tool trades. The advent of the first autumn month evidenced that business is going to be better than last year, although that was satisfactory. The many small factories that have been erected in Alabama and adjoining States are contributing to the trade activity, while large structural work shows no diminution and mining operations are on a maximum scale. Pumps, engines and boilers as well as lighter goods are in constant demand. Basic conditions seem sound.

George R. Burton, Roland G. Spearman and associates have completed the organization of a company with $15,000 capital stock to manufacture staves and headings at Talladega, Ala.

The city of Augusta, Ga., will consider the establishment at an early date of an electric lighting plant. Address the mayor.

A fruit packing plant will be established at Arcadia, Fla., by Crutchfield and Woolfolk, of Pittsburgh, Pa.

Arrangements have been perfected at Augusta, Ga., for the establishment of a factory for the manufacture of automobile tires. Weems A. Smith is president, H. S. Dunbar vice-president and James P. Armstrong secretary and treasurer. The stockholders are automobile owners.

Jernigan Bros., Brewton, Ala., will establish a sawmill on a tract of 13,000 acres in Baldwin County.

Florida Utahite Safety Powder Company will establish a plant for the manufacture of powder at Palatka, Fla., with a capacity of two tons of blasting powder per day.

The Delam Lumber Company will establish a planing mill at Carrollton, Ala. George A. Collins and H. H. Mobley, of Gordo, Ala., will be the owners.

It is announced at Gadsden, Ala., that the Alabama Pulp Company has obtained a site and will erect a paper mill with a capacity of 60,000 pounds a day. The capital stock is $1,000,000 and $800,000 is reported subscribed. Pennsylvania men are organizers of the company.

The shingle mill owned by P. L. Sutherland of Jacksonville, Fla., and operated by Zack Spinks was burned at Espanola, Fla., with a loss of $60,000 to $70,000.

The woodworking plant of W. L. and J. E. Thompson at Troy, Ala., burned with a loss of $4500.

The Pacific Coast

PORTLAND, ORE., September 11, 1913.

The general machinery market shows more life than for some time, with scattered inquiries from many manufacturers, though individual orders as a rule are small. Grain crops in eastern Oregon and Washington are turning out well, and there is a good demand for implements, traction engines, etc., as well as for flour-mill and grain-handling equipment. While large power development is proceeding slowly, there is a steady demand for motors and motor-operated machinery, as well as for generating units of small to fairly large capacity. The lumber market is thought to have reached bottom, and while the output is curtailed many mills are taking advantage of the curtailment to improve their equipment, expecting an upward movement shortly. A fair business is reported in small machine tools and shop supplies, but individual inquiries of importance are scarce.

The general building contract has been let for the briquetting plant of the Pacific Coast Coal Company.

south of Lake Washington, near Seattle. The estimated cost of the plant is said to be $250,000.

The P. J. Moran Construction Company has taken the building contract for the machine shops of the Oregon Short Line at Pocatello, Idaho, at about $100,000, exclusive of traveling crane equipment and interior steel work.

Harrison & Pepin, Chehalis, Wash., are preparing to start a shop to manufacture an automatic electric controller device for use with electric heating apparatus.

W. A. Johnston, Dallas, Ore., is building a new shop for the manufacture of cultivators and will install a number of machines, including an automatic grinder of local manufacture.

The Crossett Lumber Company, Wauna, Ore., is preparing to install new equipment to practically double the capacity of its plant.

The Louis Burton Company, Seattle, Wash., announces plans to build a factory for the manufacture of fans, air washers, steam specialties, etc., at a cost of $30,000.

Geo. H. Webb, Seattle, has been investigating conditions at Raymond, Wash., with a view to installing an evaporated milk factory.

W. S. Robbins is installing an ice factory at Moscow, Idaho.

The Virginia Consolidated Company, Virginia City, Nev., is working on plans for unwatering the lower levels of the Comstock mines. A pumping plant to cost about $70,000 is contemplated, the purpose being to resume mining operations at a greater depth.

The Wendling & Johnson Lumber Company is cutting lumber at Acme, Ore., for the construction of a modern mill of 300,000 ft. daily capacity.

The Port of Seattle Commission is having plans drawn for a dredge to cost about $200,000. The harbor improvement contemplated will require the removal of 3,000,000 cu. yds. of earth.

The Pacific Gas & Electric Company is about to increase its plant in the Potrero district, San Francisco, by the addition of another 15,000-kw. unit, consisting of a Curtis steam turbine with a General Electric generator.

The Pacific Galvanizing Works, Long Beach, Cal., is building the first unit of a plant to contain 10,000 sq. ft. The company is a merger of the Pague Mfg. Company, of Kansas City, Mo., and the Electrical & Mechanical Mfg. Company, of Los Angeles. Equipment is being shipped from Kansas City. W. H. Bennett is president, George Shields vice-president, S. T. Wolf secretary, and Will H. Wallace, of the Exchange National Bank, treasurer.

Eastern Canada

TORONTO, September 13, 1913.

The ratepayers of Walkerville, Ont., have passed a by-law granting $16,234 for an incinerator plant.

The timber mill of the J. R. Booth industries at Ottawa has been destroyed by fire with a loss of $100,000. The mill destroyed was built three years ago and new machinery had been installed at that time.

Specialties, Ltd., Montreal, has been incorporated with a capital stock of $200,000 by E. R. Bouchard, D. R. Kennedy and others to manufacture specialties.

The Durbin Train Pipe Connector Company, Ltd., Montreal, has been incorporated with a capital stock of $300,000 by R. W. Hart, A. Chenier, C. McNaughton and others to manufacture train appliances.

The Maxwell Motor Company of Canada, Ltd., Windsor, Ont., has been incorporated with a capital stock of $10,000 by W. E. Flanders, general manager; Walter M. Anthony, Ernest Edward von Rosen and others to engage in the manufacture and distribution of automobiles. Detailed plans as to manufacturing are not yet formed.

The Dominion Brick & Tile Company, Ltd., Toronto, has been incorporated with a capital stock of $200,000 by F. J. Foley, R. E. MacKinnon and others to manufacture brick, tile, cement, terra-cotta, etc.

The Flavelle Mining Company, Ltd., Toronto, has been incorporated with a capital stock of $50,000 by Thomas Browning, Thomas Cruse, T. I. Cooke and others to carry on a general mining business.

Amalgamated Motors, Ltd., Toronto, has been incorporated with a capital stock of $1,000,000 by J. F. Selby, W. H. Smith, T. O. Pardoe and others to carry on business as manufacturers, founders and engineers.

The White Laundry Company, Ltd., Windsor, Ont., has been incorporated with a capital stock of $40,000 by E. O. Sauberon, C. W. Laycock, E. R. Shaw and others.

Kent, Garvin & Co., Ltd., Hamilton, Ont., has been incorporated with a capital stock of $100,000 by H. A. Burbidge, P. J. Knox, A. H. Robertson and others to manufacture hardware, tools, etc.

The Belgo-Canadian Pulp & Paper Company, Ltd., Shawinigan Falls, Que., will erect a sulphite mill with a capacity of 50 tons per day of 24 hr., with necessary buildings so as to permit of an extension of output to 100 tons. The mill will be erected adjacent to the existing mills and will be open about August, 1914. The ground wood mill is now being enlarged and work will be completed about December. The company is also planning an extension to the paper mill, which will be completed about the end of next year.

The Swedish Crucible Steel Company, Hamtramck, Mich., a suburb of Detroit, manufacturer of the Olson tool steel plow point, advises that it will require for installation in its new plant now under construction at Windsor, Ont., a crane (either three or five-ton), direct-connected emery wheels, facing mills, tumbling mills, core and annealing ovens and a sand blast apparatus.

The new plant of the Ontario Pulp Company at Thorold, Ont., on the Welland Canal, erected at a cost of about $1,000,000, was placed in operation September 11. It is operated by Niagara Falls power and will give employment to several hundred men. James Ryan, formerly superintendent of the International Paper Company of Niagara Falls, N. Y., is the general superintendent of the new plant.

The Buffalo Forge Company, Buffalo, N. Y., will establish a Canadian branch plant at Berlin, Ont., the city having given the company a site of five acres for the building of the plant. William Wendt is president.

The Ideal Electric Mfg. Company, Ltd., London, Ont., capitalized at $40,000, has been incorporated, to manufacture electrical heating and cooking apparatus. John Sussex, Robert J. Gracey and Walter A. Cooper, London, are the provisional directors.

The name of the oil-stove company which will locate at Sarnia, Ont., mention of which was made in *The Iron Age* of last week, is the Perfection Stove Company, a branch of the Cleveland Foundry Company, Cleveland, Ohio. The Canadian company has been incorporated with a capital stock of $1,000,000. The plant will be a complete one, containing enameling and various manufacturing departments. It will consist of several one-story buildings.

Western Canada

WINNIPEG, September 12, 1913.

Encouraging statements regarding the industrial outlook in western Canada are heard at present from leading men in the different manufacturing industries. The grain crop throughout the prairie provinces has been practically all cut and threshing is making rapid progress. This, together with the expectation that the money market will soon be easier, is giving impetus to business of all kinds, and there is little doubt that there will be considerable industrial expansion next year and that there will be some improvement even in the next two or three months. The demand for machinery at the present is not particularly active, but firms are booking a fair amount of business.

The contract for the big government internal storage elevators to be erected at Moose Jaw and Saskatoon has been let by the board of grain commissioners to the Barnet-McQueen Company, Fort William. These elevators will cost nearly $1,000,000 each and the contract stipulates that they be finished by December 15, 1914.

It is reported that the Dominion Milling Company, Ltd., Melville, Saskatchewan, will build a 300-bbl. flour mill in the near future.

Prince Albert, Sask., has passed a by-law to provide $275,000 for the erection of a steam power house. This project has been under consideration for some time.

A. W. Ford, representing the Great West Textile Company, Ltd., was recently in Saskatoon, Sask., negotiating with the Industrial League for a site and concessions for a $300,000 plant for the manufacture of linen and other flax products. If a satisfactory arrangement can be arrived at work on the factory will commence soon.

The Ogilvie Flour Mills Company, Ltd., which recently finished the construction of a 4000-bbl. flour mill at Medicine Hat, Alberta, is reported as contemplating the erection of an oatmeal mill at the same city. The headquarters are in Montreal.

It is reported that the William Galloway Company will establish an agricultural implement factory in the near future at St. Boniface, Man., across the river from Winnipeg.

The Hatzic Lumber & Shingle Company, Ltd., re-

cently incorporated, with offices in the Winch Building, Vancouver, B. C., has started the erection of a large shingle mill at Hatzic, B. C.

The Heaps Engineering Company, formerly the Schaake Machine Works, Vancouver, B. C., which is now erecting a factory on Lulu Island, plans to double the capacity of the new plant.

The City Council of Calgary, Alberta, contemplates the construction of a filtration plant and pumping station. The engineer is A. W. Ellison Fawkes.

The town of Strassburg, Sask., will install an electric power plant. The secretary-treasurer is S. L. A. Smith, and the construction engineer, R. L. Biggs, of the Winnipeg Engineering Company, Winnipeg.

The Town Council of Swift Current, Sask., is planning for water works at a cost of $88,000. The secretary treasurer is Geo. D. Arnott.

Bids will be received by the city commissioners, Regina, Sask., until October 1 for coal and ash conveyors and crushers.

Delany's, Ltd., Lethbridge, Alberta, has been incorporated with a capital stock of $250,000 by Geo. A. Delany, Elias Adams, Ray Knight and others to carry on a packing and retail business. Plans are now being prepared for the plant which the new company will erect. The plant will include an abattoir and a cold storage building.

The formal opening of the rolling mills and bolt works at Redcliff, Alberta, took place last week, when the first billet was run through.

An agreement has been signed between the City Council of Medicine Hat, Alberta, and the Dominion Sanitary Fountain Company, Ltd., capitalized at $100,000, by which the latter agrees to erect a plant valued at $15,000. The city made the usual concession. The company has a factory in Spokane and other cities in the United States.

The Armour Packing Company, Chicago, will build a plant with abattoir at Calgary, Man., to cost about $500,000.

The City Council of Winnipeg passed a $13,000,000 by-law for the construction of a water system from Shoal Lake. Voting will take place on this by-law October 1.

A syndicate of local and Minneapolis capitalists, of which G. G. Devonish is the head, will shortly commence the erection of a large flour mill at Calgary, Alberta. The mill will be built in four units to cost $1,400,000 each, and when all units are completed will have a capacity of 6000 barrels of flour per day. Work on the first unit will be commenced immediately.

Government Purchases

WASHINGTON, D. C., September 11, 1913.

Bids will be received by the paymaster-general of the navy until September 23, under schedule 5822, class 70, construction and repair, for 12 worm-geared chain blocks for Philadelphia, and until September 30, under schedule 5829, class 41, ordnance, one Model C high-powered vertical milling machine for Washington.

Bids will be received by the constructing quartermaster, Port Screven, Ga., until September 22 for an addition to the boiler room and a 100-hp. boiler.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until October 7, under schedule 5848, for a traveling crane for Brooklyn.

Bids will be received at the office of the Isthmian Canal Commission, Washington, under circular 796 for furnishing for the Ancon and Mira Flores pumping station as follows: Item No. 1, 14 centrifugal pumps with electric motors and compensators. Item No. 4, one air compressor complete with motor and air receiver. Item No. 6, three 6-ton hand-operated traveling cranes.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, September 9 for supplies for the navy yards as follows:

Schedule 5783—Construction and Repair.

Class 151, two clam shell buckets—Brown Hoisting Machinery Company, $415; F. S. Banks & Co., $477.50; Wm. J. Cullen, $380; I. W. Geldart, $499.50; Industrial Supply & Equipment Company, $499.50; Industrial Works, informal; Industrial Supply & Equipment Company, $495; Link-Belt Company, $486; Meade Morrison Mfg. Company, $460; Manhattan Supply Company, $540.00; Wm. E. Williams, $385, and $519.75; C. W. Hunt Company, $636.40.

Class 91, Boston—One ore burning and annealing furnace—Garrett-Tilley Company, $4180; Chas. F. Penworthy, $5475; Quigley Furnace & Foundry Company, $6100; W. S. Rockwell Company, $4966; Tate, Jones & Co., $6750; Mirces Fuel Oil Equipment Company, $4600.

Schedule 5775—Steam Engineering.

Class 101, Portsmouth—One brass melting furnace—Chas. F. Penworthy, $2370; Macleod Company, $2525; Quigley Furnace & Foundry Company, $1328; W. S. Rockwell Company, $1981; M Fuel Oil Equipment Company, $1950.

Bids were received by Major W. J. Barden, Corps Engineers, U. S. A., Washington Barracks, D. C., S tember 8 for furnishing four motor-driven vertical c trifugal pumping sets as follows:

Blackal & Baldwin, $3540; National Electrical Supply Comp $5300; L. F. Whitman, $4753.

Bids were received by the lighthouse inspect Eleventh District, Detroit, Mich., August 25 for furni ing two oil-engine-driven air compressors for Stanna Rock Light Station as follows:

Fairbanks-Morse & Co., $3613, accepted. Chicago Pn matic Tool Company, $4244; August Meitz Foundry Comp $4310; Manning, Maxwell & Moore, $4740; De La Vergne Mach Company, $5930; Chas. J. Jager Company, type L, $7400; type $8500.

Bids were received by the lighthouse inspect Eleventh District, Detroit, Mich., August 25 for furni ing one oil-engine-driven air compressor for the Ro of Ages Light Station as follows:

Fairbanks-Morse & Co., $1806.50, accepted. Chicago Pn matic Tool Company, $2122; August Meitz Foundry Company, $21 Manning, Maxwell & Moore, $2370; De La Vergne Machine Co pany, $2965; Chas. J. Jager Company, type L, $3746; type N, $43

Trade Publications

Lifting Clamp.—William E. Volz, 126 Liberty street, N York City. Pamphlet No. 2. Concerned with a clamp for handli armor and steel plates, loading and discharging vessels, stacki plates in yards and mills, the construction of war and merch vessels, erection of structural work and use in iron, steel and br mills and foundries. The clamp is made in sizes to lift from ½ to 1 tons. Views of the various types of clamps in use for lifting pla are given, and mention is also made of a chain adjuster for shorte ing, joining or adjusting chains and slings. This adjuster, which made in four sizes, to take chains from ¼ to 1 in. in diameter, also shown, and there are a number of views giving different a plications of it.

Motor-Driven Grinding Machines.—Forbes & Mye Worcester, Mass. Folder. Shows how the use of a number of t company's small motor-driven grinding machines, which were illu trated in *The Iron Age*, June 19, 1913, at various points around t shop will effect marked savings in shop expenses. An example given of the saving for a shop of 100 men and there is a bri illustrated description of one of the machines.

Elevating and Conveying Apparatus.—Robins Conve ing Belt Company, 13 Park Row, New York City. Booklet. Ca attention to the use of this company's apparatus for coaling stea ships and for handling packages rapidly and economically. Views the equipment installed on the steamship Imperator for filling vessel's bunkers with coal, together with an installation of conve ing apparatus for handling small packages, are given.

Telephone Transmitter.—Gottschalk Waterproof Sanita Transmitter Company, 160 Broadway, New York City. Booklet Describes, with illustrations, a new form of transmitter which waterproofed to withstand either submersion or exacting condition of the atmosphere, and owing to its shape is designed to be ligh sanitary. Some experiments are described to show the sensitiveness of the transmitter and the value of the relatively small parts whic go to make it.

Alligator Shears.—Canton Foundry & Machine Company, Ca ton, Ohio. Catalogue. Gives a complete description of the variou alligator shears the company manufactures, such as high and lo knife, independent and motor-driven, as well as portable one Fine illustrations of each type and detailed measurements an weights are given. All shears are tested to full capacity before shipment.

Hoist Motors.—Westinghouse Electric & Mfg. Company, Ea Pittsburgh, Pa. Bulletin (section 3113) entitled "Selecting Moto Equipment for Electrically Operated Hoists." Gives interesting data and information on the subject of hoisting equipment. A num ber of formulæ applying to this work are embodied together wi examples. A diagram of connections of different systems is given with a question sheet for securing data on installations of this kin

Special Machinery.—Providence Engineering Works, Prov dence, R. I. Circular. Calls attention to the large capacity of th plant for the manufacture of all kinds of machinery, with specia reference to the ability of the company to assist machinery manu facturers who may find themselves at times overcrowded with work

Steel Culverts.—Canton Culvert Company, Canton, Ohio Circulars. Describe the Duro perforated, corrugated metal rai road drains for use in constructing railroad culverts. These drain are stated to be made of anti-corrosive No-Co-Ro metal, and are shipped knock-down and nested, with consequent convenience of trans portation and freedom from damage from breaking or crushing. The drains are made in sizes running from 6 to 16 in. in diameter wit half inch perforations, staggered on 4-in. centers in the corrugation valleys. They are regalvanized by the hand-dipping process after be ing perforated, thus eliminating all raw edges.